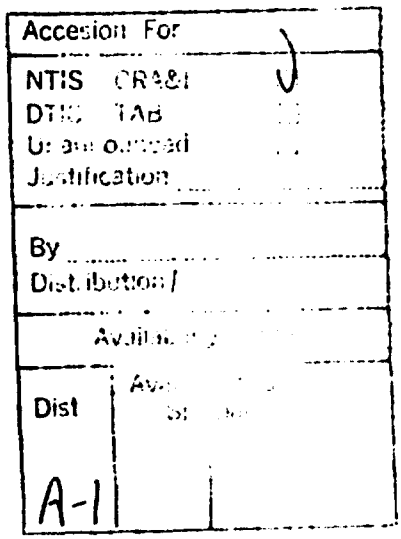
September 1993

ADA 276607

Planning and Management Failures Cause Clean Water Act Violations

CE211R3



Douglas M. Brown
Robert J. Baxter

Prepared pursuant to Army Corps of Engineers Contract DACW31-90-D-0076. The views expressed here are those of the Logistics Management Institute at the time of issue but not necessarily those of the Department of Defense. Permission to quote or reproduce any part except for Government purposes must be obtained from the Logistics Management Institute.

Logistics Management Institute
6400 Goldsboro Road
Bethesda, Maryland 20817-5886

PREFACE

This report is the third of our assessments of Army compliance challenges with regard to specific regulatory programs; the earlier reports addressed compliance with the Safe Drinking Water Act and the Toxic Substances Control Act. The report is the sixth in our overall environmental compliance management series.

Executive Summary

PLANNING AND MANAGEMENT FAILURES CAUSE CLEAN WATER ACT VIOLATIONS

A major focus of the Army's environmental compliance program in the past 2 years has been the reduction of cases in which the Army is issued notices of violation (NOVs) or other legal citations for compliance failures. Although Army installations generally can quickly correct the deficiencies identified in NOVs, the associated effort and expense could be spared if the recurring causes of NOVs could be eliminated. For violations issued under the Clean Water Act (CWA), we found that recurring systemic problems exist. Many installations must deal with inadequate training, divided responsibilities, inadequate work forces, and delayed funding. The Army must identify the responsible persons, hold them accountable, and provide them with adequate and timely funding and personnel.

We investigated 33 NOVs (with a total of 49 findings) from 15 installations. The findings cited in those NOVs fall into three general groups: (1) administrative/procedural, (2) poor operations and maintenance (O&M), and (3) exceeding permitted discharge levels. Administrative/procedural NOVs are simple to resolve; most installations correct them quickly and easily. The most dominant cause for administrative/procedural violations is that the responsible individuals lack knowledge about the regulatory requirements at the installation level. But, because of the general ease of access to the sewage system, the range of personnel needing to be aware of basic regulatory requirements and prohibitions under the CWA is very wide; it includes environmental professionals, facility operators, and the soldiers and civilians working on the installations. *The Army should ensure that the responsible environmental staff members and facility operators at each installation are trained adequately and that aggressive compliance-awareness programs for all installation employees are instituted.*

Often, installations are understaffed; as a result, they cannot effectively monitor changes in regulatory requirements and make the appropriate changes in their own procedures to avoid receiving NOVs. *The Army should develop a manpower forecasting model that will assist in determining the appropriate staffing requirements at each installation.*

The dominant cause for O&M violations is deferred maintenance or facility upgrades resulting from funding limitations. This leads to much more expensive projects in the future if entirely new facilities must be built as a condition of permit renewal. Permit expirations should come as no surprise. Effective planning can avoid the need to implement a rushed, expensive, and possibly ineffective solution. *The Army should establish a forward-looking funding system that will ensure timely routine maintenance and facilities upgrades.*

Unlike other regulatory programs, under the CWA, numerous NOVs are issued for causing pollution (i.e., exceeding permitted discharge levels). Again, installations have difficulty implementing corrective actions because of the limited availability of in-house technical experts and limited funding for contract support and for capital projects. Many installations express concern about their ability to meet continuously tightening requirements over the next few years. *The Army should establish adequate technical expertise, which, along with a forward-looking funding system, will ensure that its treatment systems can meet new standards.*

ONTENTS

CONTENTS (Continued)

TABLES

FIGURES

CHAPTER 1

WASTEWATER MANAGEMENT

FUNDAMENTALS OF WATER PROTECTION

Wastewater management activities and regulations reflect the natural incidence and use of water. The composition of water varies depending upon its location: ocean water, surface bodies of water (such as lakes and rivers, but also including running rainwater and intermittent channels), and underground water. United States statutes and regulations follow that structure. For example, ocean pollution is covered under a number of specific statutes [some of which, such as the Ocean Dumping Act, are subsumed within the corpus of the Clean Water Act (CWA) but are conventionally thought of as "separate" programs]. Underground water is regulated as part of the Safe Drinking Water Act (SDWA) and surface water is regulated by the CWA.

The term "Clean Water Act" is often used as a generic term to refer to the regulation of surface water quality. In fact, the CWA of 1977 is a revision of a family of Federal water pollution control acts dating back to the 1940s. The most recent amendment to the CWA is the Water Quality Act (WQA) of 1987. In addition, numerous state laws generally follow (but modify) the provisions of Federal law. Even more voluminous are the Federal and state regulations that have been issued to implement the applicable laws. Following the general convention, in this report we often refer to CWA to mean the entire apparatus of regulatory requirements for ensuring water quality.

The categorization of statutory jurisdiction discussed above is oversimplified intentionally. For instance, drinking water supplied from surface water is regulated under the SDWA as soon as it is withdrawn from that body of water. The mechanisms of treatment and enforcement under CWA and SDWA are very similar. We have already examined the Army's experience with SDWA in an earlier report.[1]

---

[1]LMI Report CE211R1, *Reducing Notices of Violation: Citations Received Under the Safe Drinking Water Act*, Douglas M. Brown, Linda McConnell, and Sonny Oh, July 1993.

Typically, the CWA is thought of as addressing wastewater treatment plant operations. However, the larger purpose of the CWA is to protect waters of the United States from excessive pollution. In fact, its stated goal is the return of all bodies of water to a condition suitable for swimming and fishing. In pursuit of that goal, the CWA addresses four major activities: the treatment of used water to render it clean again, the prevention of contamination from entering the water (through the storm water pollution prevention process), the cleanup of inadvertent spills of oils or hazardous substances into the water, and a recordkeeping process to document that the other three activities are being carried out properly.

The CWA does have another major component: dredge and fill permitting (which addresses wetlands development issues). Although that program is administered by the Army Corps of Engineers, and so is part of Army activities, it has a very specialized focus, has not been the subject of violations, and will not be considered further in this report.

Sources of Water Pollution

Water pollution may occur through several processes. Animals generate waste material, usually rich in nitrogen. Nitrogen is not a pollutant, but it is a catalyst for the growth in water of algae that choke off other life forms. Thermal pollution occurs in conjunction with industrial activities where clean lake or river water used in a cooling process is returned to the body of water at a higher temperature, possibly risking the viability of aquatic life.

The most often considered source of water problems is pollution caused by the addition of waste matter, often poisonous or at least unhealthy in itself, which results from human activity. Even where the polluted water is not a direct health hazard, to the extent that it cannot be used for washing or drinking it exacerbates any other health issues that may be current, and it may become a breeding ground for disease-carrying life forms. In general, this pollution occurs through two sources: industrial wastes and "sanitary" or municipal waste. While usually less toxic, except for the paint, oil, and poisons dumped down the drain by homeowners, environmentally speaking, municipal sewage is as great a problem as industrial sewage because it is rich in nutrients and organisms. Therefore, its control and treatment is not greatly different from that of industrial wastes. Sometimes the use of water by industry results in a reduction of pollution: specialized industries may need water of a

particular quality or composition, thereby requiring even drinking-quality water to be treated before industry can use it.

Treating Polluted Water

The most striking aspect of wastewater management is that its science has advanced little in several thousand years. The wastewater treatment facilities being operated in the United States today differ in detail, but not in principle, from those of pre-Roman civilizations.

The techniques by which water is treated to achieve regulatory standards are fairly generic. They are also generally quite "low-tech." Figure 1-1 shows a schematic of a typical wastewater treatment process.

Whether industrial or municipal, wastewater facilities use four generic process phases: preliminary, primary, secondary, and tertiary treatment. Preliminary treatment refers to mechanical or physical interventions. The cruder forms deal with evident contamination of relatively easily removable substances (larger objects) that would damage the subsequent treatment equipment or processes. Also included are mechanical mixing processes that speed the coagulation of smaller particles into larger ones that will settle out. At this stage, intake flow measurements are taken.

Primary treatment is a sedimentation process whereby suspended solid particles settle out of the water onto the bed of the containment structure, often a lagoon. Chemicals may be added to precipitate known pollutants. Because pure settlement processes, regardless of chemical enhancement, are considered to be at best 40 percent effective in pollution removal, primary treatment must generally be followed with secondary processes.

Secondary treatment involves the use of biological organisms to break down materials not removed by the primary process; the wastewater is processed in a trickling bed or filter system not so much to filter the waste as to maximize the surface area on which organisms can grow. As well as being highly effective, biological treatment is relatively inexpensive, whereas the cost of chemicals is both significant and recurring. But some organisms are better at processing some wastes than others, and aside from ineffectiveness due to inadequate exposure time or an inability to digest certain wastes, they can be killed completely by excessive

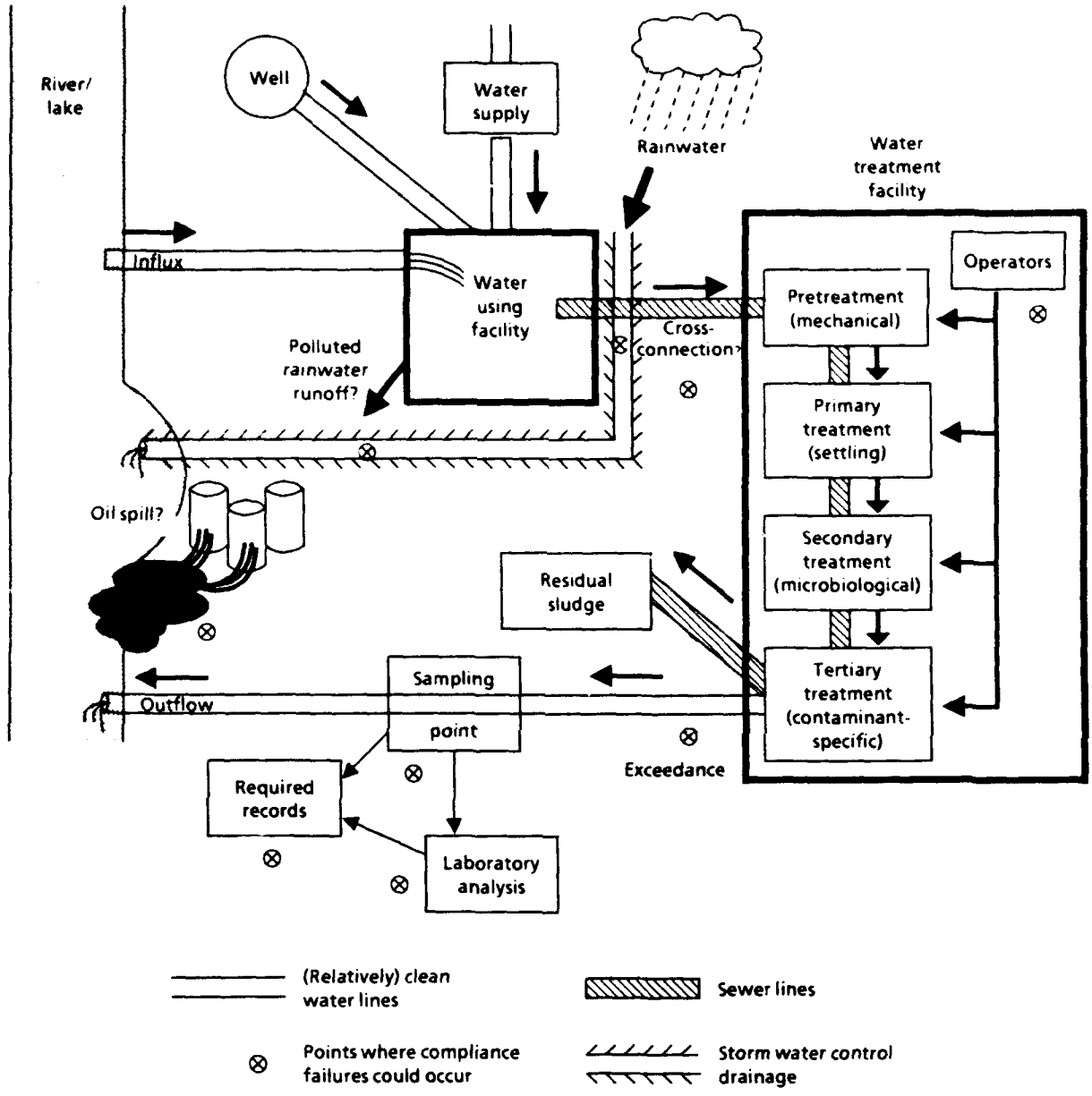


FIG. 1-1. SCHEMATIC OF TYPICAL WASTEWATER TREATMENT FACILITY

temperature shifts or by the wrong type of pollutant, especially if industrial wastes find their way into the pond.

Tertiary treatment refers to newer processes to remove specific contaminants. "Newer" is a relative term: the wastewater problems are much more stable than the majority of other environmental protection problems. In essence, tertiary treatment

renders the effluent to an immediately usable condition – including potable quality if desired – through additional and more targeted processes, usually through chemical neutralization or by using specialized organisms. Another popular tertiary process is ultraviolet irradiation.

Finally, the water must be returned to the ecological system. This may occur through evaporation; through direct discharge into a body of water; or through irrigation or seepage, which has the added advantage of allowing the earth itself to absorb (and maybe even use productively) some of the last vestiges of pollution. The water is still not "pure," and it might be environmentally unwise to make it so. Banning all impurity is not only impractical but in some cases counterproductive. Chemicals in the form of constituents such as selected minerals or fluoride are considered beneficial to animals, including humans (consider the fact that the Perrier mineral water company sells, in essence, "impure" water). In fact, most water biota could not survive long in distilled water.

The treatment processes themselves generate pollution. The material removed from the water is, after all, a concentrated (and therefore even more hazardous) mass of all the pollutants that were in the water; but it is also under control. It will in turn be treated or disposed of in land-based processes, which are regulated under the Resources Conservation and Recovery Act (RCRA) and of no concern to us for this study (even though a facility may be cited for improper handling of pollutant sludge).

Prevention of Indirect Pollution

As noted earlier, the primary means for avoiding the need for water treatment is preventing the entry of pollutants into the water in the first place. In many cases, this is accomplished through the materials handling provisions of RCRA, associated amendments to Federal law, and associated state laws. The laws require that potential pollutants be handled and stored in such a way as to minimize deliberate dumping of materials onto the soil or into conveyances that would result in pollution. Not covered under those acts, except to the extent that a pollution incident would be so gross as to constitute a health risk requiring remediation, is the potential for materials to be washed by precipitation (e.g., rainwater and snowmelt) from their current sites into waters of the United States.

As a result of this gap in the protection system, the WQA of 1987 included provisions that required all handlers of "significant materials" to review their operations for their potential to cause indirect pollution through precipitation runoff or through storm water drainage systems. Certain classes of industrial activities and large construction activities must obtain permits that call for required mitigative action and the sampling of drainage outfalls where the water flow is associated with certain activities. In addition, activities must develop storm water pollution prevention plans. Almost all major Army facilities are subject to the permitting and plan-writing requirements.

Presently, storm water regulations are not very onerous. They envision future waves of additional regulations as the Environmental Protection Agency (EPA) comes to grips with the present regulations that will expand facility coverage and the regionality of the pollution-assessment process. Those regulations have not yet taken even a vague conceptual form. Nevertheless, we do consider some potential regulatory directions in Chapter 5.

Administrative Requirements

Because the EPA cannot have inspectors everywhere at all times, the regulatory structure under the CWA depends on self-reporting by affected facilities. The primary vehicles for CWA management are management plans that commit facilities to take required actions and discharge monitoring reports (DMRs) that record the results of discharge samples taken at specified intervals. Not only do DMRs provide the technical results of the sampling (in terms of concentrations or mass), but they also require the facility to highlight the cases in which the sample results exceed allowed levels. In addition, plant operators must be certified as being competent in their duties as defined in applicable state regulations.

WATER POLLUTION REGULATION

Technology Requirements

The cornerstone of water pollution control is the Federal Water Pollution Control Act.[2] The legal framework was generally established in the 1972 FWPCA,

---

[2]Although the general outline of the course of water pollution legislation is common knowledge, much of this summary is derived from Government Institutes, Inc., *Environmental Laws Handbook*, 10th ed., 1989.

with its most significant revision being under the CWA of 1977. Although the basic regulatory framework has remained intact since 1972, a series of minor adjustments have been made to the CWA, many for the purpose of setting up specific activities or programs such as the Great Lakes project. The major statute addressing water quality issues was the WQA of 1987. The WQA addresses the cases in which basic compliance with the minimum nationwide standards previously established could not succeed in restoring the affected waters of the United States to a condition suitable for fishing and swimming. Because the FWPCA originally attempted only to regulate generic high-volume wastes, the CWA of 1977 specifically addresses the issue of designated "priority pollutants" (toxic chemicals).

Regulations pursuant to the CWA contain several key directions: national effluent standards for specific industries, general water quality standards, permit program procedures, and oil spill handling procedures. Other provisions of the law address peripheral issues that are relevant to the Army's compliance management program only in a highly specialized way.

The original deadlines for industry-specific compliance with technological standards have long passed but were extended to 1989. Under those requirements, each affected facility had to install the best practicable technology (BPT) for effluent control, taking industry practices and economic value into consideration. Facilities emitting priority pollutants had to install the best available technology (BAT) measures. For other facilities in general, "conventional" pollutants (i.e., anything affecting water quality in terms of biological oxygen demand, suspended solids, or fecal coliform had to install the best conventional technology, an improvement over the original BPT standard. In all these cases, the deadline for compliance (after extensions through amendments) was 1989 or 3 years after designation of a new regulated substance.

Pollutant discharges that are initiated after the publication of those rules must meet BAT standards; additionally, the EPA is mandated to encourage discharge avoidance.

The vehicle for enforcing those new standards, aside from regulatory inspections and reporting effluent quality, is the 5-year renewal period for permits issued as part of the National Pollutant Discharge Elimination System (NPDES). Clearly, the facility must meet the technology standard in order to receive a permit

renewal. It was the intent of the statute (hence the term "discharge elimination" in the title) to ratchet down the standards gradually until all contaminated effluent was eliminated. New plants, however, have a 10-year grace period during which effluent standards cannot be changed.

Some effluent generators do not treat the waste. They convey it, instead, to a third-party facility. Those facilities are required to meet effluent standards, and they also become surrogate regulators in that they must establish "pretreatment standards" that limit the materials in the effluent streams delivered to them. This is done to ensure that the facility process is not put at risk by an unauthorized or hazardous discharge. These potable water operators can issue citations similar to a Notice of Violation (NOV).

Water Quality Standards

An emphasis on water quality standards for the receiving body of water, rather than effluent standards for the discharge coming out of the facility, was the major impact of the 1987 amendments known as the WQA. Specific substances were designated for control, a process was devised for ratcheting down the emissions of those substances, and the states were directed to identify bodies of water where the baseline national guidance was inadequate and to devise more stringent standards to protect that water.

Permits

Water quality standards and technology standards provide fairly generic guidelines. The permit translates those guidelines into quantitative standards for the effluents of specific facilities. Permits are required for any point source discharging pollutants into any waters of the United States – a very broad definition. In fact, because the definition of "point sources" includes conveyances through which pollutants might be discharged, it includes non-point source pollutants (through precipitation runoff), and the 1987 WQA had to specify that agricultural runoff (believed by the EPA to be a major source of current water quality problems) was not included in this definition.

Permits are issued by the Federal EPA or by states' environmental agencies if the latter have been approved to do so. In order to relieve the burden on the EPA, the WQA authorized EPA to delegate permit authority even to states that had not fully

reached the stage at which they could be allowed to administer the entire CWA program. As part of the permit issuance authority, states are able to modify the conditions of permits considerably, subject to an EPA review that is generally aimed at ensuring that the permit conditions are no less stringent than the EPA had specified. And, in order to meet body-of-water-specific issues, the states review EPA-issued permits. As a result of this delegation process, the specifics of the permits and the procedural requirements that go along with those permits vary from state to state.

Permits may contain many specific provisions, but their general content remains the same: monitoring and sampling requirements (along with recordkeeping procedures), specific effluent standards, schedules for compliance, and a renewal date. Although all of the preceding provisions of regulation are enforceable, the mechanism by which they are enforced is the permit issued to the facility, and almost every NOV under the CWA refers to violations of the conditions of the permit, i.e., effluent exceedances or failure to perform required procedures. As a result, Army installations can do a great deal to limit the receipt of NOVs simply by becoming familiar with the terms of their current permits.

Storm Water Pollution Control

Pollution from indirect sources (e.g., parking lot runoff) was envisioned in the WQA, but no implementation moves were completed until October 1992 when the EPA released its Final Rule general permit. In essence, that permit required designated facilities to conform to the procedural requirements established in the general permit; facilities over certain thresholds would have to obtain individual permits, and facilities under the threshold would not be regulated at all – at least not yet. A second and subsequent round of more stringent regulations will be proposed in the future.

Storm water permits and enabling activities are just getting under way across the country, and states are still developing programs. The requirements are varied, but in general the affected facilities are still in the process of getting permits and developing pollution prevention plans (the cornerstone of storm water regulation). In Chapter 5, we discuss storm water pollution control regulations at greater length as we envision them unfolding.

Oil and Hazardous Substances Spills

Although storage tanks are generally regulated under Subtitle I of the RCRA, tanks that are used to contain oil products are regulated under the CWA. The principal regulatory measure is the Spill Prevention, Control, and Countermeasure (SPCC) plan. Spills must be reported to the EPA and/or the Coast Guard (depending on the circumstances) and containment and cleanup operations must be initiated. Spills carry a minimum administrative penalty of $5,000 per incident, along with punitive monetary damages for failure to expedite reporting or cleanup.

Spills of other hazardous substances (other than those envisioned within the NPDES permit) must be reported and remediated in a similar way. The current list of 333 hazardous substances is provided at 40 C.F.R. 116. Threshold quantities of substances at which a spill becomes reportable are established by 40 C.F.R. 117.

New statutes and regulations continue to be promulgated on the subject of spill control. However, those regulations have tended to be minor modifications to the basic general structure of the program, which rests on the preparation and implementation of SPCC plans. Although operators should find these changes conceptually easy to deal with (they simply require updating of the SPCC plans), there are inherent requirements to stay abreast of the regulatory changes and then actually to make the changes to the document. Those requirements, simple as they are, require resources.

Recordkeeping

The regulations are quite hazy on specific recordkeeping requirements. They do provide that DMRs must be prepared, but they leave the frequency and scope of the monitoring up to the individual permit writer. They also provide that treatment plant operators must be certified in accordance with state programs that are approved by EPA.

In addition to routine records, all facilities must have management plans in place. Those plans include storm water pollution prevention plans (SWPPPs) and the SPCC plan, as a minimum. Those plans must be kept up to date and include point-of-contact information, which is needed in the event of an emergency response situation.

ARMY EXPOSURE TO THE CLEAN WATER ACT

Wastewater Treatment

All Army installations generate municipal waste because of the presence of people on those installations. In addition, industrial wastes such as oils, solvents, and paints are generated in the equipment maintenance functions performed on many installations. If those wastes are placed into the sewer systems rather than being collected and disposed of as solid waste, the installation will be involved in industrial wastewater treatment. While only a small number of the Army's installations generate and process industrial waste on a major scale, those facilities are heavily concentrated in the Army Materiel Command (AMC).

Basically, three options are available to a water user creating pollution: treatment in a wholly owned plant prior to discharge, discharge to a third-party (generally municipal) wastewater system, or pretreatment of the water prior to discharge into a third-party system. The last option is usually preferred because it allows the industrial activity to defray most of the capital cost of the system and, through dilution with sewage water, makes the wastes easier to treat. The Army established a policy in which this preference is made clear.[3]

The policy of shifting to publicly owned treatment systems external to the Army is a slow one, chiefly because of the size of the previous effort to treat wastewater on post. As of 1989, the Army held 347 major NPDES facility permits and 240 minor discharge permits. Rather than decreasing over time (although the data predate the policy memorandum), the number of major permits has increased from 204 since 1984. While this generally represents increasing effectiveness of the reporting system (and, in some cases, increasing coverage under the regulations) rather than new facilities, it does show that the inventory of permitted facilities is high and will remain so for some time.

The cost of operating these systems is a significant part of the Army's operations and maintenance (O&M) budget. Tables 1-1 and 1-2 show the scope of those activities.

---

[3]U.S. Army Engineering and Housing Support Center, *Facilities Engineering and Housing Annual Summary of Operations, [the Red Book]*, FY90.

TABLE 1-1

ARMY REQUIREMENT FOR WASTEWATER TREATMENT

(CONUS)

Water system features	Capacity (gallons)
Sewage services	
• Purchased	15,578,187,000
• Treatment	31,882,265,000
Industrial wastewater treatment	36,810,151,000

Source: U.S. Army Engineering and Housing Support Center, *Facilities Engineering and Housing Annual Summary of Operations* [the *Red Book*], FY90.

TABLE 1-2

ANNUAL O&M COSTS OF ARMY WASTEWATER TREATMENT

(CONUS)

Water system features	Cost (dollars)
Sewage services	
• Purchased	$20,995,000
• Treatment	13,396,000
Industrial wastewater treatment	9,996,000

Source: U.S. Army Engineering and Housing Support Center, *Facilities Engineering and Housing Annual Summary of Operations* [the *Red Book*], FY90.

Storm Water Pollution Prevention

Even when a facility has no need for an NPDES industrial or municipal waste treatment permit because it has no processing facility, most Army facilities handle "significant materials" or perform "industrial activities" (such as maintenance operations) as a necessary supporting activity. Thus, most Army facilities are subject to the storm water provisions of the CWA.

In 1992, the Army submitted group applications for Active Army facilities and for Reserve Component facilities to the EPA. Over 60 facilities comprised the Active Army group, while over 120 facilities comprised the Reserve Component group: the

latter group was composed strictly of major maintenance activities. The AMC decided that in view of the intense and often unique industrial activities at its locations, all AMC facilities would file for individual permits. The Army National Guard was left to its own devices and decided to file for individual permits in those cases where the facilities had sufficient industrial activities to make a permit necessary.

Initial regulations required that facilities agreeing to conform to the provisions of the Federal general permit must have completed SWPPPs by June 1993. Since no Army facilities applied for general permit status (because of the group application process), Army facilities are not affected by that deadline. However, in the many states where Federal group permits will not be acceptable, there are a series of deadlines for submittal of notices of intent and for the completion of SWPPPs. The U.S. Army Environmental Center (USAEC) publishes a quarterly short-term strategy to inform the major commands (MACOMs) of what their installations should be doing in regard to permits and plans.

Spill Prevention

All Army installations handle oils and most handle other hazardous substances. Because of the broad definition of "waters of the United States," almost all of those installations fall under the CWA oil spill provisions. Those provisions require tank inspections, reporting, and spill reporting and control. As noted earlier, there are automatic fines for spill incidents under the CWA. However, deficiencies in tank management practices are generally cited under RCRA as long as there is no spill in progress.

Army installations are required to report spills to USAEC as well as to regulators, and USAEC maintains copies of those reports on file. Presently, no automated system exists for capturing such data. Because a spill does not necessarily generate an NOV, and because if an NOV were generated it would be recorded anyway, we were not asked to look at spill incidents to identify systemic problems. However, the Army should begin to develop a data management approach for spill information in order to determine whether this is a problem area or not.

Administrative Requirements

To the extent that an Army facility is subject to CWA regulation (most are), that facility must prepare the required plans, document that the required training and certification have occurred, and provide reports showing that required samples have been taken. Personnel records, especially certification and training files, must be maintained effectively.

ENFORCEMENT OF WASTEWATER REGULATIONS

Background

The United States and state regulations impose numerous requirements on facilities that operate environmentally sensitive facilities. Water regulations are no different. As noted earlier, the regulations fall into three general areas: operation of treatment systems, protection from pollution through runoff, and documentation. Failure to comply with those regulations can result in violation enforcement actions that carry fines of up to $10,000 per day. While maximum fines are seldom if ever levied, the cost of fines commonly issued under the CWA can run into the hundreds of thousands of dollars, quite apart from the costs of any required corrective actions. In addition to impacting the installation's budget, enforcement actions can get personal: environmental professionals throughout the Army are well aware of the criminal penalties that were imposed on employees of Aberdeen Proving Ground in 1989 for continuing violations of the CWA.

Potential Sources of Violations

Violations can be issued for any failure to comply with the regulation. Obviously, those failures can occur in any area addressed by the regulation; thus, failures may occur in treatment operations, in storm water pollution prevention, or in administrative requirements. Figure 1-1 identified potential problem areas in a typical water pollution scenario.

Water treatment processes

Failures in the water treatment process may be of two types: actual effluent violations and administrative violations that do not necessarily cause effluent problems.

The CWA requires the treatment plant itself to establish and enforce standards to preclude the introduction of substances that would block the operation of the plant or that simply cannot be treated by the plant. Even where the wastes being received are those expected, treatment plants are not infallible machines. Besides the possibility of the introduction of inappropriate materials, storm water runoff, unusually heavy rains, or an unexpectedly large discharge can present the plant with a water volume that it cannot handle. Because of that, inadequately treated waste is released into the environment: this condition is known as a "bypass." A bypass will also occur when plant operators detect unauthorized wastes that are harmful to the operation of the plant (especially the sludge bacteria). The offending waste is isolated when possible and is recovered as hazardous wastes; but, as an immediate reaction, the waste must bypass the system and be discharged directly into the environment.

When the release is caused by the temporary failure of the treatment system, an "upset" has occurred. Plants are generally built with auxiliary power sources to ensure that sewage can be processed even if the installation's main power grid is inoperative.

A case where a plant fails to process contaminants to prescribed levels is known as an "exceedance." Exceedances are detectable only as a result of laboratory testing of a discharge sample (as opposed to a bypass or an upset, which may be and often must be visually detectable). Quite often, the exceedance is caused by the lack of capacity in the plant, so that contaminants are passing through the facility at a rate exceeding the digestive capacity of the sludge beds. Note that this differs from a bypass in that the failure is not caused by a sudden increase in the load of either water or pollutant but instead in the steady increase in pollutant levels such that the plant no longer has the capacity to handle routine daily waste loads. Occasionally, an exceedance is simply the result of an undetected bypass.

Finally, among the potential effluent violations, even where the plant is in good working order, an unauthorized discharge may occur. This is the result of the surreptitious introduction of an unauthorized waste stream into the sewage system (as described in the bypass case above) and is not detected until samples are analyzed; in this case, we find materials that are not allowed in the waste stream at all, rather than being at excessive concentration.

Administrative violations at the plant may include improperly trained or certified operators on the job; failure to perform required actions such as inspections, maintenance, and sampling; and failure to maintain required records. None of these oversights necessarily end in pollution, but they can serve as early warning that the protective measures envisioned by the regulation may be at risk.

Sampling and Laboratory Errors

Whenever a complex and detailed process is required, the potential for error arises. Samples may be taken at the wrong times, in the wrong way, or in the wrong places. They may be improperly handled en route to the laboratory. And they may be mishandled by the laboratory, either in the testing protocols used or in the recording of the results. Often, the facility is held responsible for the failures of the laboratory, even where the only control exercised over the laboratory is through the contract payment process.

Storm Water Issues

The storm water regulations are new enough that we have little information about the way in which regulators will pursue enforcement activities. The obvious potential points of failure are those where the introduction of wastes into the storm water conveyance system becomes possible. Thus, industrial or sanitary waste entering the storm water system as a result of inadvertent cross-connection of the systems would cause a pollution incident, made more heinous by the fact that the facility is required to certify that a survey has been done to determine the absence of such cross-connections. And, as with other wastewater, sampling, and recordkeeping processes can go awry.

General Management Issues

Managers are responsible for ensuring that the program is executed as designed. The greatest evidence that this is not occurring is generally provided by the facility's own documentation, in the form of required plans and local procedure manuals that it claims to be following. And, as noted earlier, numerous other operating records are required to be maintained or submitted.

Particularly in the water arena, where nonenvironmental personnel tend to view the sewer system as the place to put things that are not wanted anymore and too much trouble to dispose of properly, failures can occur as the result of outside actions.

In essence, this is a failure of information emanating from the environmental office to the installation's population.

REPORT OVERVIEW

We have now made it clear what is being regulated under the CWA and how failures may occur. The remainder of this report addresses the information available to the Army for reviewing its own history of violations, and it provides an analysis of specific cases to determine whether systemic corrective action is needed. Chapter 2 reviews the Army's historical data. Chapters 3 and 4 describe a special data-gathering effort that was conducted to supplement the available data. Chapter 5 provides an overview of the possible future directions and implications of pending changes to the regulatory system under the CWA. Chapter 6 provides our conclusions and recommendations for an Army corrective action program.

CHAPTER 2

HISTORICAL DATA ABOUT VIOLATIONS RECEIVED BY THE ARMY

From 1985 to 1990, the Army used the *Defense Environmental Status Report* (DESR) to keep track of its environmental compliance efforts. Appendix A is a copy of the DESR format for tracking CWA compliance efforts. Appendix B displays the data from past DESR submittals from MACOMs.

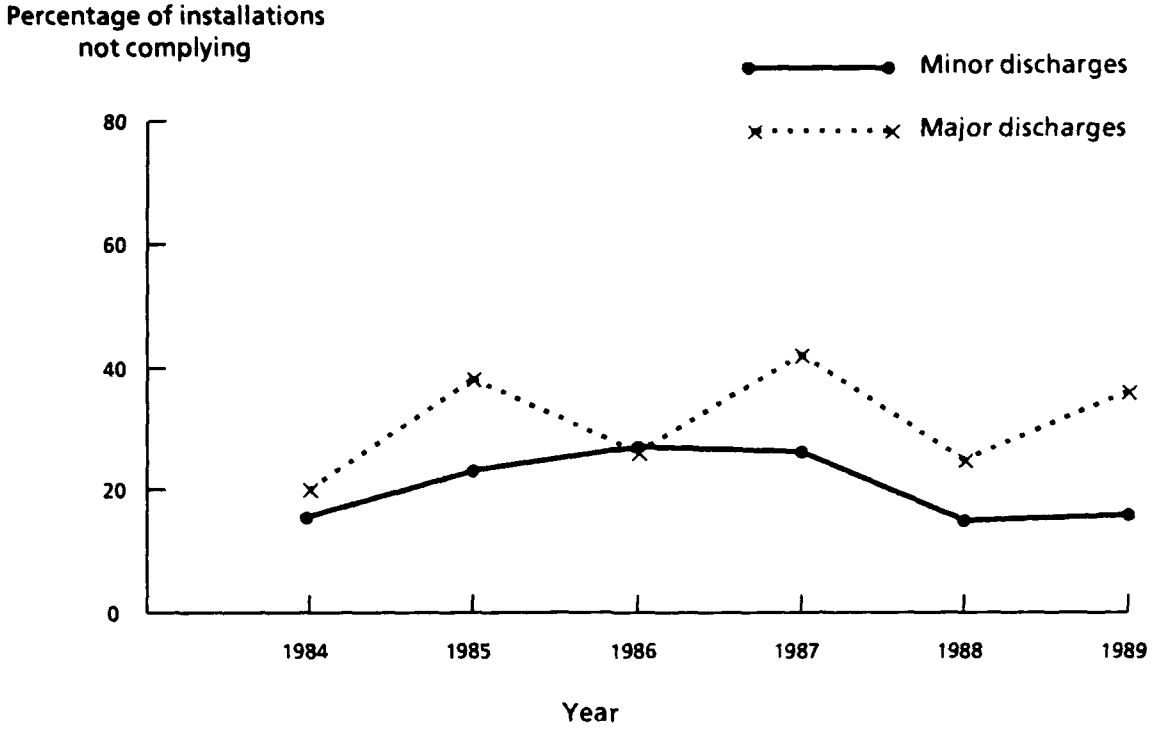
STATUS OF THE ARMY WASTEWATER PROGRAM

One of the biggest problems with the available data is that little baseline information exists. The data collection system only addresses CWA issues in general terms of violations and permits (see Appendix A). Data about the numbers and types of water discharges and treatment facilities are limited.

Because the submissions of DESR data were not stringently managed, the data contained in the DESR tend to be inconsistent, but they do provide some insight into the Army's program over the past 8 years. This chapter is based on the DESR data set that was available. In Chapter 3, we analyze the specific NOVs on file at USAEC for the past 3 years. In Chapter 4, we examine those NOVs in more depth based on interviews conducted with installation staff members.

Figure 2-1 shows overall CWA compliance rates for Army installations, as captured by the DESR. During the period covered by the DESR (e.g., 1985–1990), the number of installations out of compliance varied widely (between 25 and 40 percent) for those with major discharges and at a much lower rate (around 18 percent) for those with only minor discharges. A major discharge under the CWA is established as over 1 million gallons per day, which would be like equating (for sanitary sewers at least) a discharge from a community of 5,000 residents and the associated support businesses.

Aside from compliance rates, the DESR data reflected in Figure 2-1 show that the total number of Army installations with Army-owned wastewater treatment systems subject to CWA regulations remains high. This indicates that the Army's



Type of discharge	1984	1985	1986	1987	1988	1989
Installations with *major* permitted discharges	66	60	58	59	59	56
Number not complying	13	23	15	25	15	20
Installations with *minor* permitted discharges	75	70	63	61	73	56
Number not complying	9	16	17	16	11	9

FIG. 2-1. COMPLIANCE RECORDS BY INSTALLATIONS' TYPES OF DISCHARGES

existing policy of phasing out Army-owned water treatment plants and utilizing the water treatment facilities of surrounding municipalities will not soon reduce

regulatory impacts.[1] It will take a long time to phase out all 346 permitted wastewater treatment systems. In the meantime, the Army must ensure that those plants are operated and maintained to meet increasingly stringent CWA standards.

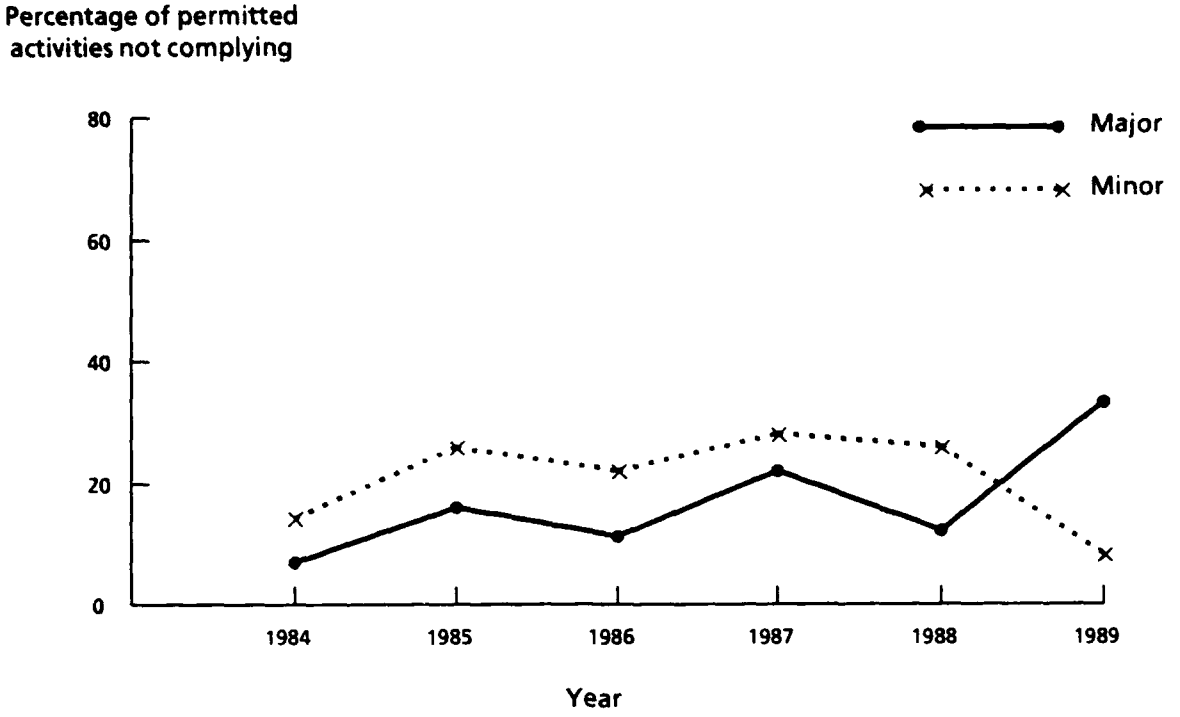
Because a large facility may have several NPDES permits (one for each treatment plant, for instance), the record of compliance by permit rather than by installation is shown in Figure 2-2. In general, both the inventory of permits and the compliance rate remained relatively stable until 1989. The sudden surge in the permit count in 1989 results from AMC installations acquiring 80 new permits in that year. The associated rise in noncompliance may indicate that the facilities were held to be noncompliant for not having the permits (so then they got them), or it may suggest that the installations got the new permits and then had difficulty meeting the permit terms. The DESR data do not permit a more insightful analysis.

In Table 2-1, we see that the Army reported almost all of its noncompliance cases (for both major and minor discharges) to be the result of failing to meet standards: in general, a problem with the capital facility itself. In 1989, almost two-thirds of the noncompliance issuances for major facilities' discharges did not result from failure to meet standards. A review of the MACOM data in Appendix B shows that the increase was entirely in AMC. Further information is not available through the DESR.

The DESR also addressed NOVs. Several of the data elements involved NOV resolution rates, which is not relevant to this report. The trend in overall NOV issuances, as recorded in the tabular portion of Figure 2-3 is quite clear; it shows a generally increasing trend. However, the proportion of NOVs that are for administrative violations, as depicted on the line graph in Figure 2-3, tend to contradict the figures provided earlier in terms of the reasons for noncompliance. Here we see a large swell in administrative violation issuances in 1987, with a subsequent diminution. The NOVs must be distinguished from actual compliance status. These figures may simply be telling us that regulators tend to look for administrative failings, which are much easier to document. This is an especially valuable point for Army managers: a decrease in the incidence of NOVs can be completely unrelated to an improved compliance rate or to a reduction of any adverse

---

[1]Memorandum, Office of the Chief of Engineers, CEHSC-FU-S, Subject: *Army Policy for Obtaining Water Supply, Wastewater, Solid Waste, Heating, Electricity and other Utility Services*, 5 September 1991.



Note: An installation may have multiple permits.

Type of permit	1984	1985	1986	1987	1988	1989
Major permits	197	220	268	257	267	346
Number not complying	14	36	30	57	31	115
Minor permits	219	187	210	226	188	213
Number not complying	30	49	47	63	49	17

FIG. 2-2. COMPLIANCE RECORDS BY PERMIT

impact on the environment. It may mean only that facilities are keeping their files more effectively.

TABLE 2-1

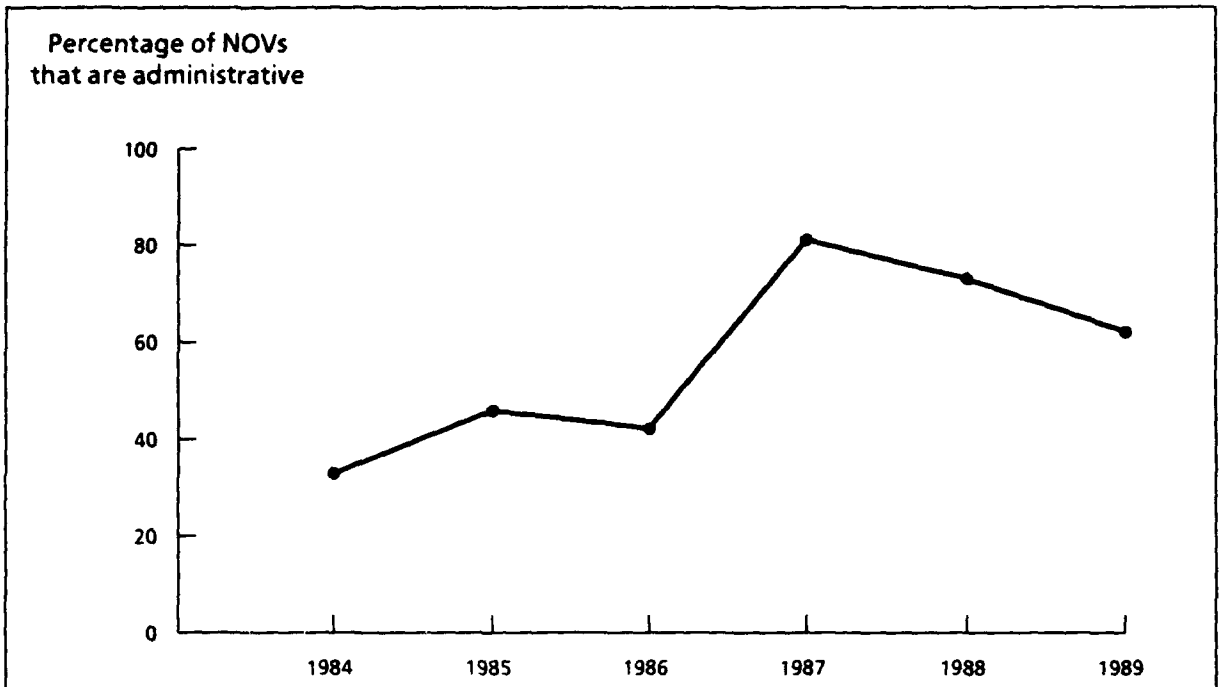
REASONS FOR NONCOMPLIANCE

Reason for noncompliance	1984	1985	1986	1987	1988	1989
Major facilities not complying						
Total[a]	14	36	30	57	31	115
Failure to meet standards	12	34	28	54	28	43
Other[a]	1	2	2	3	3	73
Minor facilities not complying						
Total[a]	30	49	47	63	49	17
Failure to meet standards	2	47	44	61	47	16
Other[a]	7	2	2	2	2	6

[a] One can quickly compute what the "Other" should be: "Total" minus "Failure to meet standards." The fact that in some cases it does not do so illustrates the limitations of the DESR data, particularly for 1984 and 1989.

A number of things may cause the unfavorable NOV trend. Three seem to be the most probable. The first possibility is that regulators are getting increasingly legalistic. In part, this is reflected by the continuing incidence of administrative NOVs, especially when we know that there is a large universe of actual standards-based noncompliance that appears not to have attracted the regulators' attention. From the DESR, we cannot determine whether regulators are conducting more frequent inspections.

Although they are decreasing as a percentage of all NOVs received, the increasing number of NOVs based on deficiencies in equipment and facilities may also indicate that the Army's wastewater plants are getting old and can no longer meet the new standards (because a lack of funding has precluded necessary upgrades). The third possibility is that Army installations do not devote adequate management attention or resources to achieve compliance.



	1984	1985	1986	1987	1988	1989
Total NOVs issued	9	15	38	38	42	58
Administrative violations	3	7	16	31	31	36
Equipment/facilities violation	0	8	24	10	13	26

Note: One can quickly compute that "Total violations" should be the sum of "Administrative violations" and "Equipment/facilities violations." The fact that in some cases it does not do so illustrates the *limitations* of the DESR data, particularly for 1984 and 1989.

FIG. 2-3 NOV RECORDS IN THE DESR

The DESR data do not provide any more detailed information for determining why NOVs are being received. Instead, we reviewed 324 CWA NOVs received at Army installations from 1989 through 1991, which were reported to USAEC. Details of the findings from those NOVs are provided in Chapters 3 and 4.

Army installations that own wastewater treatment plants should perform studies to determine whether their plants can meet current and future CWA standards and to assess the cost of achieving compliance. Those studies should also

investigate the condition of each plant, the feasibility of connecting water lines to municipal systems, and the total life-cycle conversion cost for switching to municipal wastewater systems. Because the Army's water systems will be subject to more regulations, the Army must ensure that it allocates the necessary funds to stay in compliance if the Army intends to maintain ownership of its water systems. Even after transfer of those water systems (if that occurs), the Army should expect to incur additional service charges as the municipal systems face increasing regulatory pressure.

BACKLOG OF DB 1383 PROJECT SUBMITTALS

The "DB 1383" is the Army's data base for recording proposed activities needed to support environmental requirements. Analysis of DB 1383 project submittals (as of 1992) shows that Army installations are requesting over $1.7 billion to meet CWA requirements. Of course, that figure covers both ongoing and future projects forecasted to 1999; however, Army managers should recognize that the $1.7 billion needed to meet CWA requirements is in fact larger than the Army's current compliance budget for all regulatory programs combined. Effective prioritization of funding will be essential to meet regulatory requirements; USAEC's efforts to achieve quality control over the DB 1383 project will be invaluable in this regard.

Figure 2-4 shows the breakout of the funding requests by major activity areas.

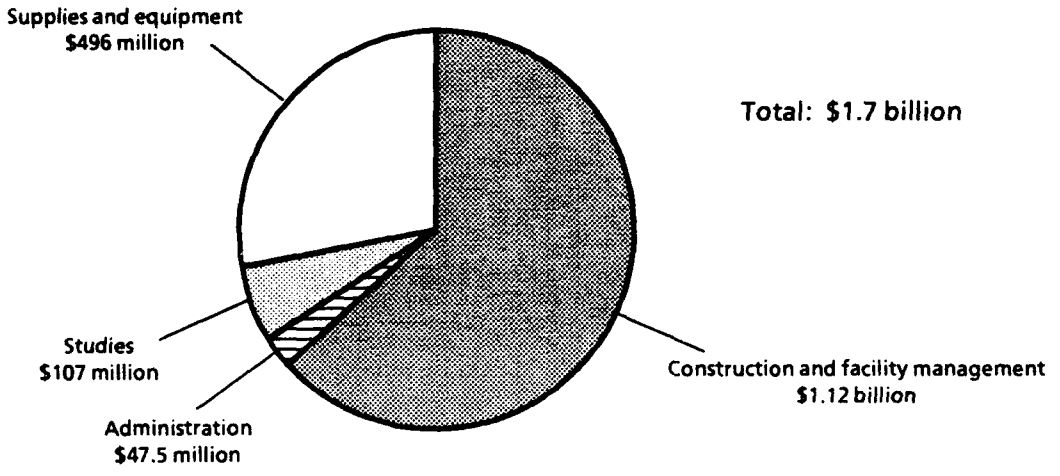


FIG. 2-4. DB 1383 PROJECTS TO ACHIEVE CWA COMPLIANCE

Figure 2-5 shows further breakdowns of where the funds are to be spent. Under "Administration," $9.8 million for staff salaries is needed. Even recognizing that a few of these projects are for multiple years for the same installation, administration requires over 100 person-years of effort just to administer wastewater programs. And it does not include the treatment plant operators themselves, who are generally employees of the installations' Directorate of Engineering and Housing (DEH).

While the Army will experience costs of $496 million in projects for plant equipment and supplies, managers should know that repairs consume almost one-half of those funds. Aging stock probably requires progressively more repair.

The Army appears to be implementing equipment and facility upgrades to meet new regulatory requirements, and also taking advantage of savings available through new technologies. Total plant upgrade expenditures (shown in both the "supplies and equipment" and "construction and quality management" pie charts) are, at $300 million, even greater than the costs for repairs. And the Army's commitment to improving the performance of its wastewater plants is demonstrated further by the proposed additional investment of $717 million in construction activities. The need for remediation activities, while significant in absolute terms at $169 million, is in fact only a small part of the Army's wastewater funding requirement.

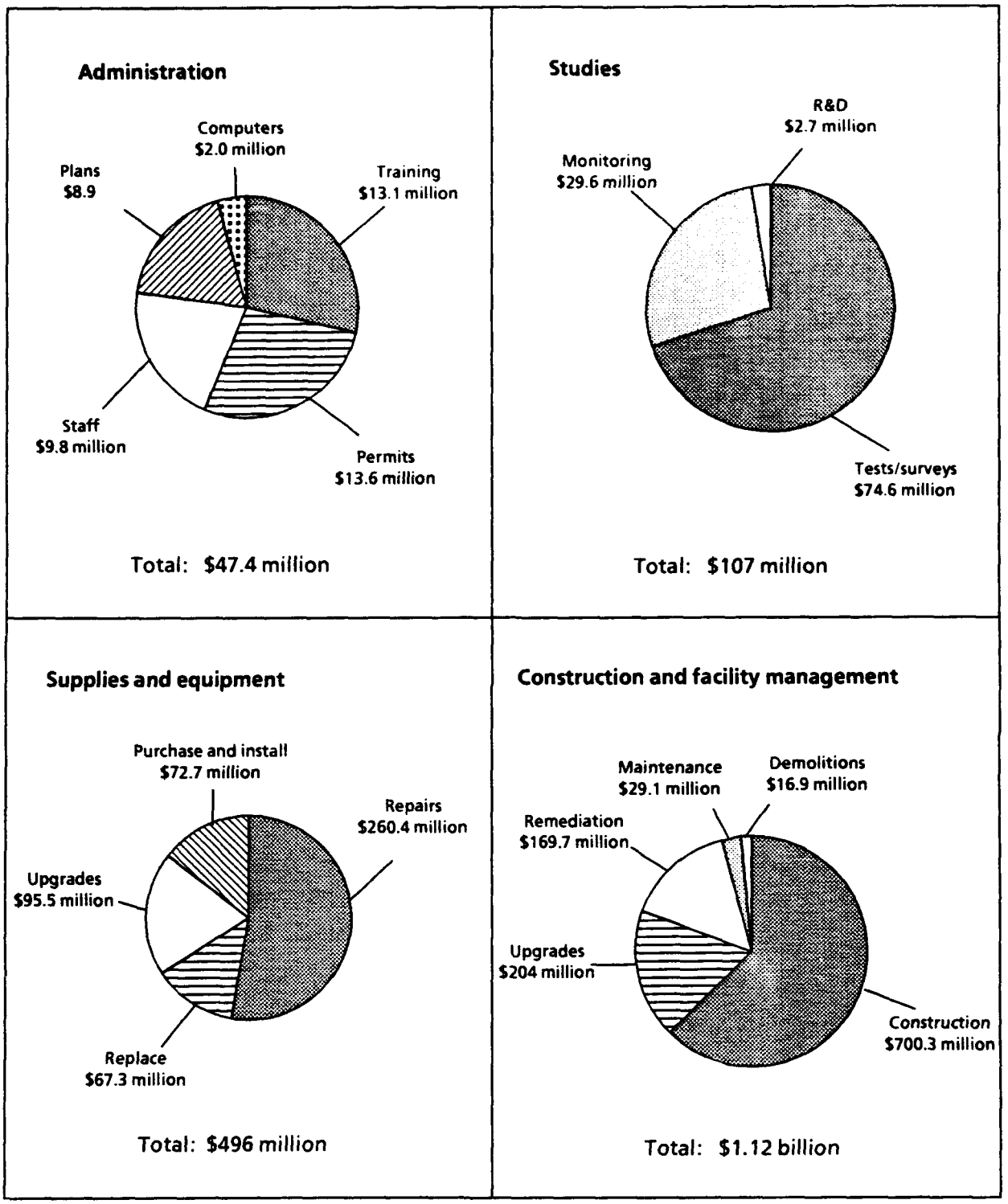


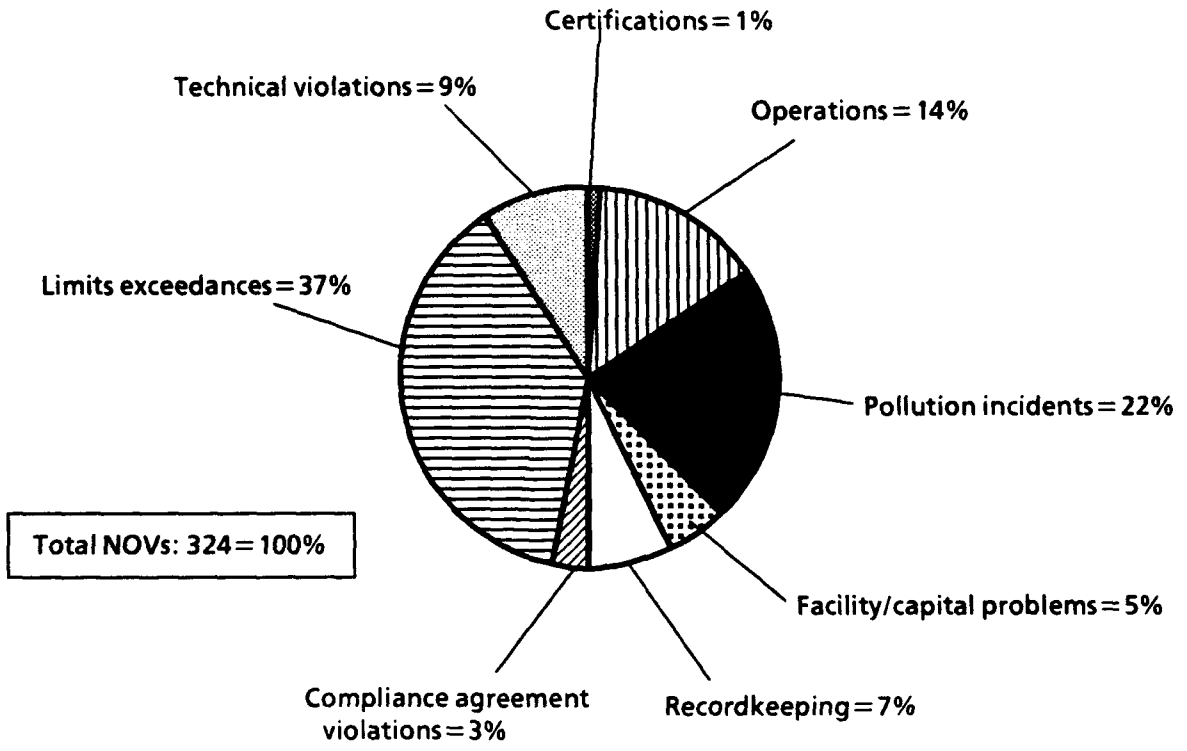
FIG. 2-5. DETAILED BREAKDOWN OF FUND REQUIREMENTS

CHAPTER 3

ANALYSIS OF NOTICES OF VIOLATION ISSUED

NOTICES OF VIOLATION AND ROOT CAUSES

Since receipt of an NOV represents the symptom of a problem, by analyzing the circumstances for receiving the NOV we can make a better assessment of the potential root causes of the problem. Figure 3-1 summarizes 324 NOVs issued to Army installations from 1989 through 1992. Table 3-1 provides a more detailed breakdown. Some initial impressions can be gained from these data. In order to verify those impressions, we conducted interviews with 15 installations that had been issued 33 NOVs (with a total of 49 findings) representing the general range of the universe of CWA NOVs. The results of those interviews are described in Chapter 4.



Note: Total does not add to 100 percent due to rounding.

FIG. 3-1. FIRST-LEVEL SUMMARY OF NOVs RECEIVED, BY PROBLEM AREA

TABLE 3-1

SECOND-LEVEL CATEGORIZATION OF NOVs, BY PROBLEM AREA

	Reason code	Number	Percent	Code definition
Limit exceedances	13	1	.31	SDWA and drinking water standards
	16	117	36.11	NPDES and pretreatment limits
	19	4	1.23	Unreported exceedances
Technical violations	21	21	6.48	Sampling, analysis, monitoring errors/failures
	23	8	2.47	Lab errors/failures/certification requirements
	31	3	.93	Uncertified personnel
Certifications	41	4	1.23	Unpermitted/unauthorized/unregistered activity/equipment
Operations	42	32	9.88	Records/files/data submissions (incomplete/late)
	44	1	.31	Storage/accumulation issues (time, volume)
	45	2	.62	General operations and maintenance failures
	46	7	2.16	Faulty/missing equipment
Pollution incidents	51	57	17.59	Unauthorized discharge/disposal
	52	3	.93	Leak/spill from container/UST
	53	5	1.54	Bypass or overflow
	54	1	.31	Contamination from spill/leak/discharge – not cleaned up
	55	2	.62	Procedural error causing spill or pollution
	57	2	.62	Spill, etc., not reported
Facility/capital problems	61	12	3.70	Facility design or capabilities
	62	3	.93	Monitoring/detection/control system
	63	2	.62	Hazardous waste treatment, storage, or disposal
Record keeping	71	10	3.09	Reports
	73	14	4.32	Forms, documents, plans, manuals, procedure (inadequate/incomplete)
Compliance agreement violations	81	2	.62	Not in accordance with compliance agreement
	82	9	2.78	Late in achieving compliance agreement milestone
	85	1	.31	Not in accordance with permit/plan/schedule/other requirements
	86	1	.31	Late with permit//plan/schedule/other milestone
	Total	324	100	

Note: Percents do not total 100 because of rounding.

The results of the NOV file review provide confirmation of the information suggested in the later years of the DESR: more than one-half of the NOVs received are for nonadministrative reasons [i.e., limit exceedances, documented pollution (unauthorized release) cases, and failure to meet compliance agreement milestones for capital facility work]. This is a significant departure from other media programs addressed in our NOV review.[1] In most regulatory programs, administrative NOVs account for as much as 80 percent of all NOVs issued. This reinforces the findings from the DB 1383 project that wastewater compliance is an extremely capital-intensive business.

This situation should also be contrasted with the findings from our earlier report in this series[2] regarding the SDWA. As may be seen by comparing a drinking water system with a wastewater system, the general concepts are the same, except that in one case the treatment follows the water distribution and in the other it precedes it. However, the outcome, in terms of NOV issuance, is clearly different. Given that the Army owns similar numbers of drinking and wastewater systems, the great discrepancy in the NOV issuance rate and in the type of solution required suggests that these programs are not as similar as they would appear on the surface.

Some possible reasons for differences in NOV issuances are as follows: the standard of performance for wastewater systems is more demanding in that the objective is to clean contaminated water rather than to treat clean water; installation managers and commanders focus more on the proper operation of the drinking water plant because of the more obvious health implications; regulators take a more stringent legalistic approach to drinking water regulation – or a more aggressive approach to enforcement.

A review of the files indicates that the data might be skewed in the direction of the limit violations because some states (especially but not only Virginia) issue NOVs month after month for limit violations against the same facility even after it has been determined that the facility cannot meet the standard until a compliance agreement has been reached. Some facilities in those states had more than a dozen such NOVs on file; thus, each of those installations had as many violations for that

---

[1]LMI Report AR202RD4, *Deriving Management Information from Notices of Violation*, Douglas M. Brown, H. L. Hassrick, and Robert J. Baxter, October 1992.

[2]LMI Report CE211R1, *Reducing Notices of Violation: Citations Received Under the Safe Drinking Water Act.* Douglas M. Brown, Linda McConnell, and Sonny Oh, July 1993.

one problem as all installations combined had for an entire class of violations (shown in Figure 3-1). Nonetheless, even if all such NOVs are disregarded (which would be inappropriate), unauthorized discharges, leaks, and spills are a very prevalent condition. The Army should also recognize that the number of NOVs issued tends to represent only a fraction of the violation conditions actually in existence. This was borne out by the compliance rate figures provided in the DESR, as discussed in Chapter 2.

A more detailed summary of the NOV findings is provided in Table 3-1. Again, by far the most significant type of finding (other than a basic citation for limit exceedances) is the unauthorized discharge or disposal of wastes into bodies of water. Assuming that installation staffs do not deliberately do that, we must assume that this occurs because of inadequate documentation of water conveyance systems and/or inadequate knowledge of installation operations, so that not all discharge points are known to the staff.

In our data collection, we distinguished between inadequate or late records that are required for operating the plants (code 42) and failures to maintain relatively static records such as contingency plans, manuals, report archives, etc., (codes 70 – 79). Those two categories together comprise the bulk of the NOVs issued after the facility and discharge cases. The remaining 70 NOVs are distributed across 13 categories, with little to note other than a fairly high rate of operational failure in the taking or processing of water samples. Despite frequent anecdotes that such NOVs are the result of errors in off-site laboratories, our data base (which draws this distinction) does not bear out such assertions.

SAMPLING AND PROCEDURAL NOVs

Installation staffs may be able to argue that inadequate funding for capital facilities is hampering their compliance efforts. However, sampling and record-keeping errors are administrative and procedural; they can be corrected easily at the installation level with no significant investment. It simply requires more effective initial training and continuing supervision. More than 80 such NOVs are on record. In fact, numerous other NOVs (such as unauthorized discharges) can be attributed to the same lack of training or supervision.

The main cause for this class of NOVs is largely that installation environmental staff members and others performing activities that affect the wastewater treatment plants do not know all procedural regulatory requirements. This lack of knowledge may result from a lack of initial or follow-up training, from inexperience, or from an overburdened staff resulting in inadequate attention to detail. The correct explanation can only be determined by deeper research into each case, which is done in Chapter 4.

Administrative NOVs are relatively easy to resolve once the environmental staff learns about the deficiencies. One-time "resolution" of a specific violation is not the same as fixing the underlying systemic problem(s) that will likely cause that violation to recur; the data base makes clear that recurring violations are not uncommon.

SUBSTANDARD WASTEWATER TREATMENT SYSTEMS

The number of NOVs issued for inadequate or improperly maintained capital facilities is significant. Even if an installation has an old wastewater treatment system, that equipment still must perform up to standard. If those installations had a proactive preventive maintenance and capital upgrade program, most of these NOVs could have been avoided. Plant supervisors have the primary responsibility for proper O&M of the treatment systems, but environmental coordinators have the primary responsibility for forecasting the need for future enhancements. Detailed coordination between the DEH and environmental staffs is needed to develop an effective funding plan.

It is an appealing shortcut for plant supervisors to reduce preventive maintenance when there is a shortage of available resources. It takes a long time before the lack of preventive maintenance causes the system to deteriorate to a point where it becomes a major problem. However, when a major problem occurs, it normally requires a large capital investment. Environmental staff and plant supervisors must periodically inspect the systems to ensure that the proper maintenance is conducted.

VIOLATIONS FOR EXCEEDING PERMIT LIMITS

Many NOVs were received for exceeding permit limits. Although we carried them differently from pollution incidents in the data base, these exceedances do result in the release of unauthorized levels of contaminants and over time they can have a serious impact on human health.

Many reasons may exist for exceeding permit limits: operator error, equipment failure, sampling error, and so forth. Generally, exceedances are indicators of an inadequate capital facility [except for one-time incidents (i.e., bypasses or upsets)]. Since the DESR data base and the NOV data base do not provide sufficient information to determine the causes of this increase, more intensive interviews were needed to determine the cause.

CONCLUSIONS FROM THE NOTICES OF VIOLATION DATA BASE

The systemic problems that appear from the data base include the following:

- lack of knowledge on the part of installation staffs about their programs, in terms of the regulations and in terms of the actual operations of the facilities on their installations;
- lack of forward funding for capital projects for aging plants or in response to regulatory changes; and
- lack of maintenance for aging mechanical systems.

With the exception of the need for upgraded capital facilities, resolving NOVs has been relatively simple for most of the installations; the need for funding for those facilities is acute, on the order of $700 million, and it will be a significant part of the Army budget for many years. Aside from the indirect impact of not having those funds to pay for more mission-oriented items or activities, the impact on the Army's missions has been minimal to date.

The NOV data base for CWA violations is so large that it is impossible to derive prescriptive remedies in any detail. But the data that we have provided here suggest that some systemic problems definitely exist. We conducted installation interviews to validate those apparent problems. The results of those interviews are discussed in Chapter 4.

CHAPTER 4

DETAILED NOTICE OF VIOLATION ANALYSIS

Because of the large numbers of NOVs issued over the past 3 years, we could not call every installation that received an NOV to explain the circumstances. Instead, we identified the types of NOVs that were most frequently issued, and we selected 15 installations at which we conducted interviews. Table 4-1 summarizes the general causes of the NOVs issued to those 15 installations. Appendix C describes the circumstances surrounding each NOV and the root causes for those violations.

TABLE 4-1

CATEGORIZATION OF CAUSES OF NOTICES OF VIOLATION, BY INSTALLATION

Installation	Root causes of NOVs							
	C	F	I	K	M	O	R	Misc.
A	√			√				
B		√						
C		√						
D		√			√	√		√
E	√			√	√			√
F		√		√	√			√
G				√	√			
H		√			√			
I				√	√		√	
J	√	√			√	√		
K			√	√	√			
L		√		√	√			
M		√	√	√				
N		√		√	√			
O	√	√	√	√	√	√		
Total	4	10	3	10	11	3	1	3

Note: C = contract problem; F = inadequate capital facilities; I = lack of installation knowledge; K = lack of environmental knowledge; M = lack of management attention/resources; O = operations and maintenance (equipment failure); R = regulator error or confusion; and Misc. = miscellaneous causes.

After evaluating the NOVs, we identified eight general root causes for receiving the NOVs. Those root causes are as follows: contract problem, inadequate capital facilities, lack of installation knowledge, lack of environmental knowledge, lack of management attention/resources, operations and maintenance (i.e., equipment failure), regulator error or confusion, and miscellaneous causes. Each root cause is discussed below.

CONTRACT PROBLEM

Violations involving contractors include cases where the contractors failed to perform tasks required by, or in the manner required by, the regulation. This may be intentional, to save costs, or inadvertent, as a result of a lack of knowledge. Sometimes contractors are prevented from performing effectively. That occurs as a result of poor contract management (such as when the contractor is hired on an as-needed basis and acts only when directed to do so). Other examples include poorly written or incompletely specified statements of work, contracting officers' lack of familiarity with environmental contracts, lengthy (or otherwise unresponsive) Army contracting processes, and any other contract-related factors.

INADEQUATE CAPITAL FACILITIES

The treatment of wastewater is a process that requires large and expensive capital facilities. When the facilities become too old to keep running effectively, or when changing regulations force the water to be treated to a standard that the facility simply cannot achieve, a large investment must be made to construct new facilities. In some cases, the failure to upgrade the facility is the result of a low priority being placed on the funding of such a project; that is classified as a management failure. However, it is difficult to tell when a plant will fail: the old technology deteriorates very gradually and the quality of the incoming water to be treated changes over time. Thus, the initial means for determining inadequacy is a water sample that fails to meet standards, which, because it must be reported, sometimes generates an automatic NOV. Sometimes, changes are required as a condition for obtaining a new permit; failure to make the changes will result in an NOV.

LACK OF INSTALLATION KNOWLEDGE

A new cause that became clear through our investigation of NOVs under the CWA was lack of knowledge about installation facilities and operations. This may range from, say, not knowing how, when, where, or by whom storm drains are cleaned out, to having complete facilities on the installation about which the responsible environmental staff member knows nothing. Similar findings were made in our earlier report regarding violations under the TSCA. Numerous NOVs resulted from regulators finding transformers about whose existence the installation staff knew nothing.

In earlier studies, we found that violations occur and recur because there is a complete lack of a technical solution to a specific problem. No such cases were found for NOVs under the CWA, although there were numerous cases of recurrent NOVs for failing to implement a known solution.

LACK OF ENVIRONMENTAL KNOWLEDGE

An organization's lack of environmental knowledge may occur because no environmental professionals are assigned. It also can occur as a result of inexperienced and/or inadequately trained personnel. In the case of the CWA violations, assigned personnel who must be knowledgeable include not only the installation environmental professionals but also water treatment plant operators and laboratory technicians (when applicable). Soldiers and other operator-level personnel may (if not otherwise trained) take actions that result in violations. We include in this category cases in which procedures were known and/or specified but individuals failed to follow them. And it would be difficult for a supervisor to identify those failures without replicating individuals' work.

LACK OF MANAGEMENT ATTENTION/RESOURCES

An individual creating a CWA violation situation may do so because of a lack of knowledge, occasional errors, or a lack of interest leading to an error. When this lack of knowledge or interest becomes pervasive, the problem should be corrected by the supervisor, who should also institute quality control systems on the most important actions (for instance, ensuring that required samples are documented and reported). While many such cases exist, numerous violations occur because managers above the on-the-scene supervisory level exercise no effective oversight or interest in the

program. This may extend from having inadequate systems of quality controls or feedback to (at the opposite extreme) refusing to take actions required to support the needs of the CWA program, especially with regard to funding. Violations may manifest themselves in technical ways that result from inadequate or delayed funding for corrective actions that are known to be needed. This class of violation can also result from decisions made by installation managers to ignore regulatory pressures until after the issuance of an NOV.

OPERATIONS AND MAINTENANCE (EQUIPMENT FAILURE)

Most equipment-related violations (as opposed to the capital-intensive problems noted above) occur as a result of inadequate maintenance of the water system, either in the machinery at the plant or in the piping system located between the user and the plant. This inadequate maintenance may be the result of inadequate funding, inadequate attention to requirements, or (especially in the case of the piping systems) the inevitable deterioration of, and breaks in, a system that is too large to maintain proactively. Violations can occur as a result of unexpected failure of equipment, even though the proper preventive maintenance has been performed.

REGULATOR ERROR OR CONFUSION

On occasion, NOVs are inadvertently issued or issued as a result of regulator mistakes. On other occasions, the installation may be issued an NOV because of action taken on the basis of a regulator's incorrect advice or unwillingness to provide timely advice. Here, we have also addressed cases where the NOV was issued as a result of a genuine disagreement between the installation and regulators over the intent or specific requirements of a regulation; however, as a rule, such cases are attributable to an inadequate staff understanding of the regulation (i.e., a knowledge deficiency).

MISCELLANEOUS CAUSES

In addition to the main causes noted above, we found miscellaneous instances of unique or unsolvable causes. One such cause is simple human error, which can be controlled but will occur from time to time. Another cause (unique to water issues, i.e., CWA and SDWA) is installing a new process or addressing a new standard; during the preliminary runs of a system as the correct mix of chemicals for effective treatment is sought, permit limits may be exceeded.

Some of the causes of NOVs occur more frequently than others. The differences are even more pronounced when we consider the number of specific citations within the NOVs that are issued. The 15 installations received a total of 49 citations. Table 4-2 shows the causes noted above as they apply to the citations. The total causes add up to more than 49 because some citations had multiple causes. Because the minor or unique contributing causes are less widespread, they tend to cause a single NOV at a single installation, which is then sensitized to the issue; as a result, their numbers do not change from the one to three observations seen in Table 4-1. The major causes that the Army must address recur at installations from one citation to the next, and their numbers are proportionately larger in Table 4-2 than in Table 4-1.

TABLE 4-2

IMPACT OF ROOT CAUSES ON VIOLATIONS CITED

Cause	Code	Number of NOVs issued
Contract problem	C	6
Inadequate capital facilities	F	11
Lack of installation knowledge	I	4
Lack of environmental knowledge	K	30
Lack of management attention/resources	M	21
Operations and maintenance (equipment failure)	O	6
Regulator error or confusion	R	1
Miscellaneous causes	Misc.	3
Total	—	82

Lack of environmental knowledge at the installation level is the dominant cause for receiving NOVs. Aside from errors of omissions by environmental and facilities engineering staff members, compliance under the CWA depends on supporting laboratory staff, construction contractors, and soldiers and civilians across the installation who must know not to dump unauthorized materials into the sewers. Installation environmental staff members indicated that most of the NOVs were resolved quickly when violations were pointed out by regulators.

It is important to draw the distinction between one-time "resolution" of a specific NOV and the permanent elimination of the type of violation that the NOV cites. The installations consistently stated that environmental staff members are overburdened and fail to keep track of minor regulatory changes since they are too busy with different compliance in other regulatory programs. Because of the continuing rotation of soldiers from one installation to another, as well as between assignments at a single installation, lessons at the operator and unit levels must often be relearned. As a result, "resolved" NOVs can and do recur.

The daily operation of facilities is not under the control of the environmental staff at many installations. The plants belong to the DEH, and the environmental staff plays a regulatory oversight role. Under the CWA, plant operators and laboratory analysts have significant regulatory compliance roles and must be aware of these associated responsibilities. In addition, environmental staff members cannot wait until an NOV is issued before looking at treatment plant operations.

After lack of knowledge on the part of staff members, the next most dominant cause for the receipt of an NOV is an earlier lack of concern by management. Lack of management attention and poor supervision problems were quickly resolved when installations received an NOV. In many cases, those supervision problems can be resolved with the institution of quality control checks by managers and supervisors once they become aware that something must be checked. In a way, these NOVs have served as a "wake up call" for Army installations and their leadership to pay more attention to CWA compliance issues.

The large number of facility-related NOVs in the data base, and the similar proportion shown in the DESR, is supported by the case studies. While only 11 of 82 findings attributed to this cause are shown in Table 4-2, notice that in Table 4-1, over one-half (9 of 15) installations in our sample reported inadequate facilities as a cause of NOV receipt.

The intensity of solutions requiring capital investments, combined with the strain on Army budgets that can be expected in the next few years, is going to place managers in a difficult position. Avoiding major NOVs for capital facility failures will require action to be taken when sample results first start indicating future problems; yet funding for what appear to be problem-free situations at the time (or deferrable problems) will take place at the expense of other activities.

Capital facility inadequacies occur often. NOVs occur proportionately less often because an installation can enter into a compliance agreement once the need for a new facility is identified. As long as projects are proceeding as planned under the agreement, the facility will not be held in violation. Thus, part of the elimination of that type of NOV is the establishment of an effective protocol for determining the impending inadequacy of facilities and for entering into reasonable and supportable agreements. However, the agreement becomes a binding obligation, the violation of which tends to draw a stiffer penalty than violation of limits without an agreement. Thus, if the Army enters into compliance agreements, it needs to be prepared to fund them.

The review of the cases supports the assessments derived from the NOV data base (provided in Chapter 3). There, we supposed that the primary problems included lack of staff knowledge, lack of installation awareness, lack of supervisory attention, and (in largest measure) the lack of funding for capital projects.

Various solutions can be developed to address the problems identified so far. By targeting a specific problem with an appropriate solution, this cause-and-effect chain can be broken to eliminate further NOVs. This study does not address specific solutions to avoid specific violations. However, in Chapter 6, we do provide some specific programmatic recommendations that address the major and most consistent deficiencies. Implementation of those recommendations should improve the overall program and result in the elimination of a significant proportion of the NOVs.

ADMINISTRATIVE NOTICE OF VIOLATIONS

The majority of violations, (33 of 49 NOVs, i.e., 67 percent) do not directly cause pollution. They can be classified as administrative NOVs. These NOVs are largely caused by the installations' environmental staff members' failure to know the procedural regulatory requirements. (Some of the other violations that resulted in pollution could have been avoided if more experienced operators were able to identify the warning signs in the samples, or if facility designers were more conversant with the regulations. These are also procedural or regulatory knowledge issues.) This lack of knowledge may result from inexperienced or overburdened staff members who must deal with increasingly complex regulatory requirements. Even the most experienced environmental staff members can be caught off guard because the regulations are constantly changing and are difficult to understand.

Within the CWA context, a lack of required knowledge is also in part caused by the fact that responsibilities are split between the environmental and engineering staffs. While plant operators are required to be certified (and that requirement itself is sometimes violated), further training depends on the operator's supervisory chain. Also, the environmental staff tends to assume that trained operators and analysts are fully competent. Thus, environmental staff members tend to remain uninvolved until regulators identify a deficiency. Additionally, the wastewater plants' performance is affected when installation residents and tenants dump wastes that were not intended to be handled by the plants. Detergents, oils, acids, and pesticides are wastes often found in troop work areas that frequently enter the sewer system because of a lack of knowledge and supervision in the troop units.

In general, administrative NOVs are incidental in nature (in that regulatory requirements simply had been overlooked). Those violations do not pose a serious threat to human health. However, those violations create an unfavorable image of the Army by implying that installation-level environmental professionals do not have adequate concern for the health risks associated with violations of the CWA. They create the appearance of impropriety. More importantly, administrative NOVs potentially can lead to actual pollution incidents that may have a serious impact on human health if they persist. To avoid administrative NOVs, the most practical solution has been to hire fully qualified environmental professionals to monitor CWA compliance. However, wastewater plants tend to be operated by DEH personnel rather than technicians under the control of the environmental staff; thus, training solutions must address both offices.

Administrative NOVs are relatively easy to resolve once the environmental staff and the operators learn about the deficiencies. All installations cited have taken immediate corrective measures soon after deficiencies were identified. Again, we must emphasize that one-time "resolution" of a specific violation is not the same as fixing the systemic problem that will cause that violation to recur.

Regulatory CWA requirements are constantly changing; it is very difficult to avoid receiving administrative NOVs unless someone constantly keeps track of all applicable requirements for each installation and develops appropriate corrective actions. The implementation of the Environmental Compliance Assessment System (ECAS) auditing process will help to identify deficiencies before regulatory inspections find them; but, because those audits are infrequent, installations must

develop their own capabilities. To eliminate those types of NOVs, the Army must develop an extensive research capability to perform analyses of all CWA regulations (Federal, state, and local) to stay current on all regulatory requirements that apply to Army installations. Either way, installation environmental staff must stay on top of regulatory changes and identify and implement appropriate corrective action. Some continuing training efforts need to be organized to inform the installation-level environmental staff about regulatory changes and how to take the appropriate proactive or corrective actions.

SUBSTANDARD WASTEWATER TREATMENT SYSTEMS

Because treated waste is discharged to a conveyance that leads to a stream, river, or lake that will be used by people in some way, NOVs received for facility failure can have a serious impact on human health. The numbers of NOVs issued for this cause are large, by comparison with training or supervisory failures, in view of the relative numbers of NOVs issued under other regulatory programs. (As a rule, actual pollution cases tend to be about 15 – 18 percent of all NOVs, one-third of that found under the CWA.)

Pollution incidents arise from two causes: maintenance failures or inadequate facilities that cannot meet the standards.

Maintenance Failures

Some installations have neglected the proper upkeep and maintenance of their water treatment systems. Although those systems are old, the equipment must perform up to standards. If those installations had a good preventive maintenance program, most maintenance-oriented NOVs could have been avoided. Plant supervisors have the primary responsibility for proper operations and maintenance of the treatment systems.

It is an appealing shortcut for plant supervisors (or, more often, installation and MACOM managers and budgeteers) to reduce preventive maintenance when there is a shortage of available resources. It takes a long time before the lack of preventive maintenance causes a system to deteriorate to a point where it becomes a major problem. However, when a major problem occurs, it normally requires a very extensive capital investment. Environmental staff members and plant supervisors

must periodically inspect water treatment systems to ensure that the proper maintenance is conducted.

Inadequate Facilities

When an NOV is received for exceeding permitted discharge levels, installations are often confused about who is responsible for implementing corrective measures. Often, the environmental office becomes responsible; but, unlike administrative violations, these NOVs require technical solutions to resolve them. Depending on the scope of a plant's inadequacies, the development of appropriate technical solutions can be a very complex process. Normally, sanitary engineers are brought in to develop an engineering solution. However, many installations do not have such engineers on their staffs. Consulting engineering firms are normally hired to provide technical support.

Many installations' environmental managers are concerned about aging water treatment facilities and equipment. Several violations can be attributed to simple obsolescence of the water treatment systems. To sustain compliance and avoid future substantive violations, a coordinated effort among operators, water engineers, and environmental staff members is needed. That coordination is critical in developing projects to resolve equipment deficiencies.

When more stringent or additional standards are proposed, usually as part of a permit renewal, they are normally followed by some confusion and controversy about how to meet the new standard. Army installations must review their water systems and determine the measures that are required to satisfy new standards. Although architectural and engineering and environmental firms are hired to provide technical support, the Army needs to develop internal expertise to ensure that the corrective measures taken are both adequate and in the best interest of the Army.

Aside from the technical challenges, facilities' capital projects must be funded. Unlike drinking water plants, where the health risk to the population of the installation appears obvious to all decision-makers, sewage treatment plants sometimes experience difficulty in obtaining funding expeditiously. Partly, this results from the confusion concerning viable solutions and partly from the environmental staff members' failure to explain the need for the facilities' upgrades

in a manner that is convincing to the decision-maker who must take funds from other worthy programs.

CONCLUSIONS REGARDING NOVs

Army installations have received NOVs for a number of different reasons, principally obsolescent facilities and inadequately trained staff members. Difficulties have been accompanied by stricter regulatory enforcement (including more frequent inspections as well as tougher interpretation of the regulations) and a permitting process that requires increased sampling, monitoring, and periodic technical improvements to meet ever more stringent discharge standards. Although increasingly stringent regulations are sometimes enacted to provide more regulatory control rather than any additional measure of pollution control, the Army must correct any deficiency to ensure full compliance.

Resolving NOVs has been relatively simple for most of the installations: the impact on the Army's mission has been minimal to date. However, the case studies reveal some structural weaknesses within the Army's compliance programs. The Army does not have adequate environmental regulatory knowledge or the technical expertise to ensure that all Army-owned water treatment plants are in compliance. Also, there is not always a clear division of organizational responsibility for tasks among various functional experts. Until these structural problems are addressed, Army installations will be forced to perform continuous, reactive patchwork to resolve NOVs by the most expedient methods to relieve the regulatory pressure.

CHAPTER 5

FUTURE DIRECTIONS FOR WATER POLLUTION REGULATION

The CWA has remained relatively stable since the Water Quality Act of 1987. The major ensuing legislation has been the Oil Pollution Prevention Act, which does not significantly affect the way the Army does business. All of this could change in 1993–1994 when reauthorization of the CWA is expected. Traditionally, major program changes occur in conjunction with the reauthorization process. However, initial discussions with U.S. House of Representatives staff members indicate that no major change of direction is anticipated other than a greater emphasis on the control of non-point-source pollution.

While the Army, as a major landholder, would be affected by non-point-source pollution provisions, the shape of the regulations that would evolve from such statutory emphasis is unclear. The Army is a relatively benign user of land, compared with agricultural and industrial facilities. If regulations focus on the discharge of toxic materials from non-point-sources, the impact of a greater statutory emphasis may be minimal. However, the Army does have large tracts of land under agricultural and grazing leases, and it would be required to ensure that pollution from such uses is controlled. Even where land is seldom used, as in the majority of the installations' maneuver areas, a significant amount of erosion and soil disturbance occurs as a byproduct of training activities, especially where tracked vehicles are involved. If the regulations emphasize controlling soil discharges, the Army's current erosion control and training area management practices may have to be modified further.

Regulations on NPDES discharges are unlikely to be made more stringent. In the absence of new scientific information, there would appear to be no reason for changing the technical definitions of "fishable, swimmable" water quality conditions; water treatment plants are already required to meet best available technology (BAT) standards at the time of permit renewal. Because the Army experienced a large increase in the number of permits held during 1988–1989, we can expect that many of those permits will come up for renewal in 1993–1994 because NPDES permits are valid for 5 years. New technologies will probably need to be put in place at those

facilities. The necessary funding must be programmed into the Army budget at least 1 year ahead of time in order to complete the necessary design work and establish construction schedules before the current permits expire.

Storm water pollution control regulations are still being implemented. Although the EPA has essentially deferred consideration of the "Phase II" (watershed control) aspects of those regulations pending an evaluation of the success of the initial round of rules, the Army has a great number of actions to complete in the near future. Storm water pollution prevention plans (SWPPPs) must be completed for several hundred facilities. Installations will be kept very busy writing the supporting standard operating procedures and guidance memos needed to implement the "baseline" (nonstructural) measures that are required; in some cases, significant funding will be required for the structural controls that will have to be implemented.

Another issue in the storm water area is the matter of construction permits. The EPA has been ordered to reconsider the exclusion of all sites below 5 acres. Presently, the Army plans to make the Corps of Engineers responsible for permitting for such large construction sites. If the standards change (and even if the Federal government makes no change, states may choose to adopt more stringent standards), the Corps may prove to be an inappropriate agency for addressing such permits. Earlier, we recommended to USAEC that installations' Directorate of Engineering and Housing staffs (that is, facilities engineering rather than environmental offices) retain the mission of obtaining needed construction permits, with appropriate review done by environmental staff members. However, the Army must develop a management policy to implement this (or any other) approach and must exercise oversight to ensure that the cognizant installation staff members are aware of their responsibilities.

Proposed oil pollution control regulations have recently (March 1993) been issued by the EPA; it will take some time for those regulations to become final. The Army will need to follow the progress of those regulations in order to ensure that it is prepared to take any required actions within whatever compliance deadlines may be established.

In short, at the Federal level, water pollution control requirements are continuously shifting, but they appear to be quite stable and slow-moving. The Army

must monitor developments (i.e., proposed rules, regulations, and legislation) in order to present relevant testimony and comment on time to preclude the adoption of regulations that will pose unreasonable compliance difficulties.

Because all but 11 states have primacy for controlling water pollution control efforts, the regulatory picture at the Federal level cannot be the Army's only focus. States are at various points in their efforts to identify bodies of water that do not meet water quality standards and to implement storm water regulations. In all states, monitoring is a labor-intensive effort that the Army must undertake in order to stay abreast of requirements.

CHAPTER 6

CONCLUSIONS AND RECOMMENDATIONS

The installations we surveyed have already begun to implement corrective actions to solve the problems highlighted by the NOVs that they received. We have considered whether those case-by-case corrections are aimed more at the symptoms than at the underlying problems.

In this report, by analyzing the NOVs as a group rather than by individual installations, we identified some systemic problems. Major types of deficiencies were addressed in Chapters 3 and 4. Those deficiencies are that the Army's installation-level environmental staffs and/or water treatment plant operators often (1) are in error; (2) are unaware of regulatory requirements; (3) choose not to comply with the regulations; or (4) on occasion, are simply unaware of the fact that the regulated activity is even going on, that facilities are sometimes unmaintained or obsolete, or that the process of initiating corrective action itself is unresponsive. In a very few cases, NOVs can be explained by regulator error, a situation that seldom occurs despite its popularity as an anecdotal cause of NOVs. In a small number of cases, we found unique or unavoidable circumstances for which the Army need not establish preventive programs. Examples of these circumstances are one-time operator errors, events associated with the shakedown operations of new equipment, and so forth.

In other regulatory programs, we find that similar systemic problems have been identified. Action to resolve those problems, illustrated once again through the CWA program, will simultaneously relieve problems in other programs. The remainder of this chapter discusses the need for general programs to eliminate the systemic problems.

KEEPING UP WITH THE REGULATORY TREADMILL

Maintaining an adequate understanding of regulatory requirements and ensuring that those requirements are met can only be done with careful attention to the Army's work force. The problems identified in this area are caused by an inadequate understanding of, or attention to, regulations.

In the case of the CWA, no violations seemed to result from inadequate numbers of operators or environmental staff members. While no violations occurred as a direct result of failed coordination between environmental staff members and DEH operators and/or managers, several cases of systemic failure to comply could have been avoided if environmentally-qualified staff members had inspected the facilities prior to the regulators doing so. In a number of cases, the facilities were not inspected simply because the staff members did not know about the existence of those facilities. On occasion, lack of knowledge was demonstrated by a contractor rather than installation staff members; nonetheless, in most of these cases proper management oversight would have revealed the error. The vast majority of NOVs were received because the staff members at Army installations were not knowledgeable about regulatory requirements or because they were unable to convince nonenvironmental decision-makers to take action to fully comply with the CWA.

Assigning the Responsibility

Army installations now have at least one full-time environmental professional and they are very much aware of their role in achieving full compliance. Many installations' environmental office staffs are growing rapidly and they are assuming more compliance responsibilities from other functional organizations such as the Directorate of Engineering and Housing (DEH) or installation preventive medicine offices. Although it is expedient to assign corrective action responsibilities to environmental staff members, in the long term it is counterproductive if it relieves the direct facility operators of the responsibility for carrying out their jobs properly.

Achieving full compliance with the CWA requires properly designed plant facilities, a preventive maintenance program, appropriate and adequate equipment and operations procedures, a proper sampling and monitoring program, and certified plant operators. When different groups of people are responsible for specific tasks, no single person is in charge of achieving full compliance. Often installation environmental professionals become the de facto focal points for ensuring that the plant meets the environmental regulations. However, those professionals usually do not have the authority to take corrective actions. Better coordinated and aligned organizational responsibilities are needed.

The challenge is to properly align responsibilities with existing capabilities of each group of functional experts to ensure sustained full compliance. Plant

operators, sanitary engineers, and preventive maintenance staff members must have a clear understanding of their responsibilities for sustaining full environmental compliance. Training strategies then can be developed for each group to enhance their job performance.

Cadre of Qualified Professionals

Most of the NOVs were received by installations because the responsible staff member either did not know the regulatory requirements or failed to perform routine actions. Under the CWA, plant operators must be certified prior to assuming their duties. Therefore, there should be no shortage of qualified operators and there should be little excuse for failure to perform required tasks.

Nonetheless, people fail on occasion. Some employees are not sufficiently dedicated; they will take a shortcut if they think that nobody in the supervisory chain will be able to detect the omission (or do anything about it). Even though we recommend that plant operators (regardless of who they work for) be held responsible for proper performance of their duties, it is essential that an oversight capability be maintained through the professional environmental staff. Thus, a critical factor in avoiding NOVs and achieving compliance is having an adequate number of qualified environmental staff members. Presently, the Army has no way to identify what constitutes an adequate staff level. The Army should consider developing a manpower model to determine an appropriate staff size given its workload.

Since the CWA is primarily administered by the states, installations must keep track of their own state regulations and how these regulations (which are much more subject to change than the mature Federal CWA program) may impact their water treatment plants. Therefore, installation environmental staff members are the critical link in understanding what the Army must do to achieve full compliance. They must monitor new state regulatory developments and develop the appropriate corrective actions to meet new requirements.

Once the installations establish the ability to monitor regulations by hiring environmental professionals, they often require technical support to develop corrective actions to satisfy new requirements. Although environmental professionals understand regulatory requirements, they often are not knowledgeable about the proper operation and maintenance of water plants. Civil and sanitary engineering expertise are needed to formulate appropriate engineering solutions to retrofit

deficient plants. In a number of cases, installations do not have facility engineers who can perform water system design tasks. In such cases, most installations rely on private architecture-engineering firms to do the corrective technical work. But nobody is available to validate the work of those contractors. A few installations have used the Army Environmental Hygiene Agency (AEHA); again, the Army may need a cadre of experienced operators and environmental engineers available to provide Army-wide support.

Hiring qualified engineers is expensive. Some installations cannot generate enough work to justify maintaining such personnel on staff. Some centralized organization can be established to serve as centers of expertise providing technical assistance to installations. Those organizations can be a part of MACOM staffs, Engineering and Housing Support Center (EHSC), USAEC, or AEHA. Further study should be done to determine the most appropriate organizations to provide the required technical support.

Understanding Regulatory Requirements

Because regulations, standards, and procedures vary widely from one state to another, establishing formal Army-wide training (in the sense of formal programs of instruction) to teach installation environmental professionals about CWA regulations will not be effective. Most installation environmental staff members have sufficient background training that, with sufficient time, they can read the regulations and find out what new regulations may require. Any questions can be followed up with a phone call to regulatory agencies for clarification. Additionally, the existence of dozens of different programs administered by EPA regions and states forces centrally-driven training to be overly generic; it would require local data supplementation anyway. However, the provision of adequate and continuing training appropriate to the needs of individual employees is vital. Again, a clear distinction exists between providing the training itself and ensuring that training is provided.

Environmental Awareness

The best efforts of the environmental staff office cannot overcome a lack of command interest in environmental compliance. In a number of cases, we found that the violation condition had existed for some time and the installation had simply chosen not to fund a remedy. A significant number of limits exceedances and

unauthorized discharges are believed to be caused by the dumping of unauthorized pollutants as a result of a lack of knowledge or effective supervision in the troop units or civilian activities that are tenants on military installations.

Few NOVs were issued for allowing unauthorized materials into the wastewater system. However, at some installations and through talking with installation staff members (as part of the installation survey), we observed that upsets do occur as a result of the influx of unauthorized materials (chiefly oils). Only strong command emphasis can prevent such occurrences.

In a case where the responsibility for compliance has been severed from the responsibility for plant operation, as is frequently the case on Army installations, command emphasis becomes all the more important.

The Army is already working on identifying decision-makers who can affect the environmental program and ensuring that they receive appropriate environmental awareness training. This effort should be fully supported.

As regulators identify continuing deficiencies that are not corrected because an installation chooses not to fund the needed work, it becomes clear to staff members that their efforts are fruitless. In addition, as the relationship with the regulator deteriorates, the volume of deficiencies cited increases along with the requirement for funds to address them.

FUNDING

Most installations now receive enough funds to resolve NOVs to achieve basic operational compliance. This has not been the case in the past, and it remains a problem for the future because of the immense need for capital funding to upgrade obsolescent facilities. The Army must make resources available to achieve and sustain full compliance, not simply to resolve NOVs but to properly maintain and operate water treatment plants to protect the health of the community. That includes forecasting the need for major upgrades and replacements and providing for those actions in a timely manner.

Army installations need a sound technical evaluation capability to identify funding requirements and to develop engineering solutions. Externally conducted ECAS audits must be supplemented with an internal self-inspection capability and a command-wide or Army-wide analysis of the inventory of plants.

The development of an effective forward-looking funding program depends on support from the entire chain of command. Energetic measures must be taken by environmental staff members to make installation commanders aware of requirements in advance of the need and in a manner that emphasizes the value of the expenditure. As noted earlier, awareness of training for such commanders is critical for obtaining the funding needed to remain in compliance.

CONTRACT MANAGEMENT

In several cases, errors were made by contractors when they installed or operated equipment and, predominantly, when they processed water samples. In the eyes of regulators, and consistent with the Army's leadership tradition, the installation remains responsible for its actions even if operating responsibility has been shifted to another party.

Installation staffs simply cannot check for all potential contractor errors. Those errors tend to be associated with the technical issues that gave rise to the original need for contract support. The contracts process should prequalify potential support contractors; contracts should contain penalty clauses for failures of performance. However, in most of the NOVs, the error was easily identifiable (e.g., failure to submit required periodic reports) and the required action would have been required of the installation staff had there been no contractor involved. Thus, it is important to develop effective program management tools to identify suspenses.

UNRESPONSIVE ADMINISTRATIVE SYSTEMS

Even when a deficiency is known to exist and the remedy has been identified, corrective action cannot occur until all of the necessary administrative actions have been completed. Water system project approval may have to be obtained from the installation staff, from regulators, and sometimes from higher headquarters. Funding must be budgeted for, allocated, and put into place for the project. In many cases, contracts must be devised, announced, competed, awarded, and put into operation. New personnel may have to be hired, in which case position descriptions

must be written, positions approved, funds made available, announcements made, interviews conducted, and so on through the time that the new hire is at full productivity. All of these things take time. The longer they take, the more frustrated all parties become; when regulators become frustrated, they may be likely to issue more NOVs.

An installation, or even the entire Army, can do little to eliminate the delays built into these processes by statutes or regulations. But things can be done to structure the situation properly through planning.

The first line of defense to detect systemic deficiencies and technical problems is an effective compliance monitoring program. While the ECAS process is a leap in that direction, it applies to installations only every 3 years; additional audits must occur on the installation's initiative in the intervening years. In conjunction with compliance monitoring, continuing professional development is required to ensure that the staff are aware of the requirements.

Continuing professional development and ECAS together provide advance notice of problems. Also, effective use of the DB 1383 data system can help the installation assess its total environmental requirements and prioritize CWA issues appropriately. Routine acceptance of the need for unspecified operations and maintenance costs provides a fund for dealing with unanticipated, but routine small problems.

Contract lead times can be reduced through basic ordering agreements that provide for continuing services on an as-needed basis. The relatively simple operating requirements of the CWA make such agreements possible. They could be established for operating support, for compliance audits, and for miscellaneous design and management support tasks. In that way, as requirements arise that demand supplementation of the installation staff, the ordering agreements can be acted upon swiftly. Clearly, major procurements and construction projects would require specific authority and a full procurement process; but even those can be speeded up by having support available to initiate design and planning work.

At the installation level, personnel management can be more flexible. Positions should be coded for all appropriate career codes, not just the single code held by the previous occupant. When possible, job descriptions should be revised to reflect the duties actually performed; since those duties tend to expand over time, personnel can

be rewarded by appropriate grade increases. Appropriate requirements for technical or professional certification must be implemented, union objections notwithstanding. At the same time, job descriptions (and the environmental organization) can be structured to reflect the realities of the employment market; where the necessary specialists are not available, contracting of a function or development of in-house personnel through internships or training may be needed. This will not reduce the manager's workload; it may increase it until automated system assistance is available, but it will make the deployment of personnel, finances, and time more effective.

SUMMARY OF RECOMMENDATIONS

We recommend that the Army develop initiatives to provide adequate numbers of adequately trained staff, to ensure that routine operating costs are funded, and to reduce administrative delays in executing compliance actions. Specific recommendations are as follows:

- Ensure that the responsibility for proper operation of environmentally sensitive facilities is firmly fixed upon the plant operators and their supervisory chain; decide whether that chain should be engineering- or environmental-based.
- Provide a cadre of engineers with operating and environmental experience to provide Army-wide technical support.
- Develop a manpower model to assess environmental staffing requirements.
- Require certification for all persons working on environmentally sensitive facilities.
- Provide for continuing professional development training of environmental professionals and other personnel connected with the environmental mission.
- Hold commanders and nonenvironmental decision-makers responsible for the success of the environmental programs under their control and provide awareness training to those personnel.
- Conduct research to determine the appropriate level of operation and maintenance funding for permitted facilities; then ensure that such funding is included in installation budgets and supported at MACOM and Department of the Army levels.

- Develop program management tools to help installation staffs manage their own regulatory programs or provide oversight to key elements of a contract-supported program.

In addition, we recommend that the Army review its data collection requirements in order to capture facility data that allow Army environmental staff offices to provide key decision-makers with assessments of the compliance status against, and the impact of, proposed regulations. The Army should also review its administrative processes, particularly contracting and personnel management, to identify generic improvements such as those noted earlier that would serve managers in all areas.

APPENDIX A

"DEFENSE ENVIRONMENTAL STATUS REPORT" DATA COLLECTION FORM (WASTEWATER)

DESR DATA COLLECTION FORM (WASTEWATER)

TABLE 2

WASTEWATER COMPLIANCE STATUS

PERIOD COVERED: FY _____ COMPONENT_____

COMPLIANCE DATA	AS OF LAST PERIOD	AS OF CURRENT PERIOD
1. NO. OF INSTALLATIONS		
A. WITH PERMITTED* DISCHARGES (MAJOR*/MINOR*)		
B. WITH PERMITTED DISCHARGES OUT OF COMPLIANCE (MAJOR/MINOR)		
2. NO. OF NPDES PERMITTED DISCHARGES*		
A. IN BEING (MAJOR/MINOR)		
B. OUT OF COMPLIANCE (TOTAL) (MAJOR/MINOR)		
1. NO. THAT EXCEED STANDARDS (MAJOR/MINOR)		
2. NO. FOR OTHER REASON (MAJOR/MINOR)		
3. NO. OF NOTICES OF VIOLATION (NOVs)		
A. NO. OF NOVs UNRESOLVED AT THE START OF PERIOD (TOTAL)		
1. NOVs WHICH REQUIRE ADMINISTRATIVE OR OPERATIONAL CHANGES TO RESOLVE		
2. NOVs WHICH REQUIRE POLLUTION ABATEMENT PROJECT(S) TO RESOLVE		
B. NO. OF NOVs RECEIVED DURING PERIOD (TOTAL)		
1. NOVs WHICH REQUIRE ADMINISTRATIVE OR OPERATIONAL CHANGES TO RESOLVE		
2. NOVs WHICH REQUIRE POLLUTION ABATEMENT PROJECT(S) TO RESOLVE		
C. NO. OF NOVs RESOLVED DURING PERIOD (TOTAL)		
1. BY ADMINISTRATIVE OR OPERATIONAL METHODS		
2. BY POLLUTION ABATEMENT PROJECT(S)		
4. NO. OF NPDES PERMITS APPLIED FOR, NOT FINAL (EPA/STATE)		

NOTE: TERMS UNDERLINED AND MARKED WITH AN ASTERISK ARE DEFINED IN THE GLOSSARY, PART 3.

APPENDIX B

MAJOR COMMAND DATA CONTAINED IN THE "DEFENSE ENVIRONMENTAL STATUS REPORT"

TABLE B-1

SUMMARY OF DESR TRENDS: ALL REPORTING MACOMs

	1984	1985	1986	1987	1988	1989
Major permitted discharges						
WESTCOM	1	1	1	1	1	3
USMA	1	1	1	1	1	1
ISC	0	0	0	0	0	0
AMC	29	26	28	30	28	30
TRADOC	10	10	10	10	10	9
MTMC	0	0	0	0	0	0
MDW	0	0	0	0	0	0
INSCOM	0	0	0	0	0	0
HSC	2	2	2	2	2	2
FORSCOM	124	20	16	15	17	11
ARNG	6	0	5	5	11	2
Total	173	60	63	64	70	58
Reported by Army	66	60	58	59	59	56
Difference	107	0	5	5	11	2
Minor permitted discharges						
WESTCOM	0	0	0	0	0	1
USMA	1	1	1	1	2	1
ISC	2	2	2	0	1	1
AMC	20	21	18	24	31	27
TRADOC	10	10	19	7	7	8
MTMC	2	1	1	1	1	0
MDW	0	0	0	0	6	1
INSCOM	1	1	1	1	0	0
HSC	1	1	2	3	3	2
FORSCOM	32	33	18	24	22	12
ARNG	32	0	18	15	22	38
Total	101	70	80	76	95	91
Reported by Army	75	70	63	61	73	56
Difference	26	0	17	15	22	35

Note: WESTCOM = U.S. Army Western Command; USMA = U.S. Military Academy; ISC = Intelligence and Security Command; AMC = Army Materiel Command; TRADOC = Training and Doctrine Command; MTMC = Military Traffic Management Command; MDW = Military District of Washington; INSCOM = Information Systems Command; HSC = Health Services Command; FORSCOM = U.S. Army Forces Command; ARNG = Army National Guard; NPDES = National Pollutant Discharge Elimination System; NOVs = notices of violation; and EPA = Environmental Protection Agency.

TABLE B-1

SUMMARY OF DESR TRENDS: ALL REPORTING MACOMs (Continued)

	1984	1985	1986	1987	1988	1989
Major permitted discharges not complying						
WESTCOM	0	0	0	1	1	3
USMA	0	0	0	1	1	0
ISC	0	0	0	0	0	0
AMC	5	14	9	18	10	10
TRADOC	2	3	3	3	3	3
MTMC	0	0	0	0	0	0
MDW	0	0	0	0	0	0
INSCOM	0	0	0	0	0	0
HSC	0	0	0	0	0	0
FORSCOM	6	6	3	2	2	4
ARNG	0	0	1	1	3	0
Total	13	23	16	26	20	20
Reported by Army	13	23	15	25	15	20
Difference	0	0	1	1	5	0
Minor permitted discharges not complying						
WESTCOM	0	0	0	0	0	1
USMA	0	0	0	0	0	0
ISC	0	0	0	0	1	1
AMC	2	10	10	11	7	3
TRADOC	4	4	4	1	1	1
MTMC	0	0	0	0	0	0
MDW	0	0	0	0	1	0
INSCOM	0	0	0	0	0	0
HSC	0	0	0	0	0	0
FORSCOM	4	2	3	4	1	3
ARNG	3	0	7	3	9	14
Total	13	16	24	19	20	23
Reported by Army	9	16	17	16	11	9
Difference	4	0	7	3	9	14

Note: WESTCOM = U.S. Army Western Command; USMA = U.S. Military Academy; ISC = Intelligence and Security Command; AMC = Army Materiel Command; TRADOC = Training and Doctrine Command; MTMC = Military Traffic Management Command; MDW = Military District of Washington; INSCOM = Information Systems Command; HSC = Health Services Command; FORSCOM = U.S. Army Forces Command; ARNG = Army National Guard; NPDES = National Pollutant Discharge Elimination System; NOVs = notices of violation; and EPA = Environmental Protection Agency.

TABLE B-1

SUMMARY OF DESR TRENDS: ALL REPORTING MACOMs (Continued)

	1984	1985	1986	1987	1988	1989
Major NPDES permitted in being						
WESTCOM	1	1	1	1	1	3
USMA	1	1	1	1	1	1
ISC	0	0	0	0	0	0
AMC	159	180	222	220	229	307
TRADOC	12	12	24	15	16	11
MTMC	0	0	0	6	0	0
MDW	0	0	0	0	0	0
INSCOM	0	0	0	0	0	0
HSC	2	2	2	2	2	1
FORSCOM	23	24	18	18	18	23
ARNG	6	0	3	11	10	1
Total	204	220	271	274	277	347
Reported by Army	197	220	268	257	267	346
Difference	7	0	3	17	10	1
Minor NPDES permitted in being						
WESTCOM	0	0	0	0	0	1
USMA	3	3	3	3	4	4
ISC	2	2	2	0	2	7
AMC	80	89	105	104	103	112
TRADOC	50	50	33	38	37	39
MTMC	7	7	6	0	6	0
MDW	0	0	0	0	2	2
INSCOM	1	1	1	2	0	0
HSC	2	2	2	3	3	4
FORSCOM	33	33	58	70	31	37
ARNG	32	0	16	16	23	34
Total	210	187	226	236	211	240
Reported by Army	219	187	210	226	188	213
Difference	−9	0	16	10	23	27

Note: WESTCOM = U.S. Army Western Command; USMA = U.S. Military Academy; ISC = Intelligence and Security Command; AMC = Army Materiel Command; TRADOC = Training and Doctrine Command; MTMC = Military Traffic Management Command; MDW = Military District of Washington; INSCOM = Information Systems Command; HSC = Health Services Command; FORSCOM = U.S. Army Forces Command; ARNG = Army National Guard; NPDES = National Pollutant Discharge Elimination System, NOVs = notices of violation; and EPA = Environmental Protection Agency.

TABLE B-1

SUMMARY OF DESR TRENDS: ALL REPORTING MACOMs (Continued)

	1984	1985	1986	1987	1988	1989
Major not complying (total)						
WESTCOM	0	0	0	1	1	2
USMA	0	0	0	1	1	0
ISC	0	0	0	0	0	0
AMC	6	28	23	48	23	102
TRADOC	2	3	5	3	3	3
MTMC	0	0	0	0	0	0
MDW	0	0	0	0	0	0
INSCOM	0	0	0	0	0	0
HSC	0	0	0	0	0	0
FORSCOM	6	5	2	4	3	8
ARNG	0	0	0	2	2	0
Total	14	36	30	59	33	115
Reported by Army	14	36	30	57	31	115
Difference	0	0	0	2	2	0
Minor not complying (total)						
WESTCOM	0	0	0	0	0	0
USMA	0	0	0	0	0	0
ISC	0	0	0	0	2	4
AMC	5	27	31	50	39	11
TRADOC	20	20	5	2	3	1
MTMC	0	0	0	0	0	0
MDW	0	0	0	0	2	0
INSCOM	0	0	0	0	0	0
HSC	0	0	0	0	0	0
FORSCOM	5	2	11	11	3	1
ARNG	3	0	4	4	7	9
Total	33	49	51	67	56	26
Reported by Army	30	49	47	63	49	17
Difference	3	0	4	4	7	9

Note: WESTCOM = U.S. Army Western Command; USMA = U.S. Military Academy; ISC = Intelligence and Security Command; AMC = Army Materiel Command; TRADOC = Training and Doctrine Command; MTMC = Military Traffic Management Command; MDW = Military District of Washington; INSCOM = Information Systems Command; HSC = Health Services Command; FORSCOM = U.S. Army Forces Command; ARNG = Army National Guard; NPDES = National Pollutant Discharge Elimination System; NOVs = notices of violations; and EPA = Environmental Protection Agency.

TABLE B-1

SUMMARY OF DESR TRENDS: ALL REPORTING MACOMs (Continued)

	1984	1985	1986	1987	1988	1989
Major not complying exceeding standards						
WESTCOM	0	0	0	1	1	1
USMA	0	0	0	1	1	0
ISC	0	0	0	0	0	0
AMC	5	26	21	45	22	34
TRADOC	2	3	5	3	3	2
MTMC	0	0	0	0	0	0
MDW	0	0	0	0	0	0
INSCOM	0	0	0	0	0	0
HSC	0	0	0	0	0	0
FORSCOM	5	5	2	4	1	6
ARNG	0	0	0	2	2	0
Total	12	34	28	56	30	43
Reported by Army	12	34	28	54	28	43
Difference	0	0	0	2	2	0
Minor not complying exceeding standards						
WESTCOM	0	0	0	0	0	0
USMA	0	0	0	0	0	0
ISC	0	0	0	0	2	4
AMC	5	26	31	48	38	11
TRADOC	19	19	4	2	3	1
MTMC	0	0	0	0	0	0
MDW	0	0	0	0	2	0
INSCOM	0	0	1	0	0	0
HSC	0	0	0	0	0	0
FORSCOM	5	2	9	11	2	0
ARNG	0	0	3	4	2	8
Total	29	47	48	65	49	24
Reported by Army	2	47	44	61	47	16
Difference	27	0	4	4	2	8

Note: WESTCOM = U.S. Army Western Command; USMA = U.S. Military Academy; ISC = Intelligence and Security Command; AMC = Army Materiel Command; TRADOC = Training and Doctrine Command; MTMC = Military Traffic Management Command; MDW = Military District of Washington; INSCOM = Information Systems Command; HSC = Health Services Command; FORSCOM = U.S. Army Forces Command; ARNG = Army National Guard; NPDES = National Pollutant Discharge Elimination System; NOVs = notices of violation; and EPA = Environmental Protection Agency.

TABLE B-1

SUMMARY OF DESR TRENDS: ALL REPORTING MACOMs (Continued)

	1984	1985	1986	1987	1988	1989
Major not complying for other reasons						
WESTCOM	0	0	0	0	1	1
USMA	0	0	0	0	0	0
ISC	0	0	0	0	0	0
AMC	1	2	2	3	1	69
TRADOC	0	0	0	0	0	2
MTMC	0	0	0	0	0	0
MDW	0	0	0	0	0	0
INSCOM	0	0	0	0	0	0
HSC	0	0	0	0	0	0
FORSCOM	1	0	0	0	2	1
ARNG	0	0	0	0	0	0
Total	2	2	2	3	4	73
Reported by Army	1	2	2	3	3	73
Difference	1	0	0	0	1	0
Minor not complying for other reasons						
WESTCOM	0	0	0	0	0	0
USMA	0	0	0	0	0	0
ISC	0	0	0	0	0	0
AMC	0	1	0	2	1	5
TRADOC	1	1	0	0	0	0
MTMC	0	0	0	0	0	0
MDW	0	0	0	0	0	0
INSCOM	0	0	0	0	0	0
HSC	0	0	0	0	0	0
FORSCOM	0	0	2	0	1	1
ARNG	3	0	3	0	5	1
Total	4	2	5	2	7	7
Reported by Army	7	2	2	2	2	6
Difference	−3	0	3	0	5	1

Note: WESTCOM = U.S. Army Western Command; USMA = U.S. Military Academy; ISC = Intelligence and Security Command; AMC = Army Materiel Command; TRADOC = Training and Doctrine Command; MTMC = Military Traffic Management Command; MDW = Military District of Washington; INSCOM = Information Systems Command; HSC = Health Services Command; FORSCOM = U.S. Army Forces Command; ARNG = Army National Guard; NPDES = National Pollutant Discharge Elimination System; NOVs = notices of violation; and EPA = Environmental Protection Agency.

TABLE B-1

SUMMARY OF DESR TRENDS: ALL REPORTING MACOMs (Continued)

	1984	1985	1986	1987	1988	1989
NOVs unresolved at start of period						
WESTCOM	0	0	0	0	1	1
USMA	0	0	0	0	1	0
ISC	0	0	0	0	0	0
AMC	3	2	15	7	9	4
TRADOC	0	0	1	3	4	4
MTMC	0	0	0	0	0	0
MDW	0	0	0	0	0	3
INSCOM	0	0	0	0	0	0
HSC	0	0	0	0	0	0
FORSCOM	4	5	2	2	6	6
ARNG	0	0	2	3	6	2
Total	7	7	20	15	27	20
Reported by Army	8	7	18	12	21	18
Difference	−1	0	2	3	6	2
NOVs required administrative or operating changes to resolve — Start						
WESTCOM	0	0	0	0	0	0
USMA	0	0	0	0	1	0
ISC	0	0	0	0	0	0
AMC	0	0	0	1	0	0
TRADOC	0	0	0	0	1	1
MTMC	0	0	0	0	0	0
MDW	0	0	0	0	0	3
INSCOM	0	0	0	0	0	0
HSC	0	0	0	0	0	0
FORSCOM	4	5	1	1	2	2
ARNG	0	0	0	2	4	1
Total	4	5	1	4	8	7
Reported by Army	4	5	1	2	4	6
Difference	0	0	0	2	4	1

Note: WESTCOM = U.S. Army Western Command; USMA = U.S. Military Academy; ISC = Intelligence and Security Command; AMC = Army Materiel Command; TRADOC = Training and Doctrine Command; MTMC = Military Traffic Management Command; MDW = Military District of Washington; INSCOM = Information Systems Command; HSC = Health Services Command; FORSCOM = U.S. Army Forces Command; ARNG = Army National Guard; NPDES = National Pollutant Discharge Elimination System; NOVs = notices of violation; and EPA = Environmental Protection Agency.

TABLE B-1

SUMMARY OF DESR TRENDS: ALL REPORTING MACOMs (Continued)

	1984	1985	1986	1987	1988	1989
NOVs requiring abatement to resolve – Start						
WESTCOM	0	0	0	0	1	1
USMA	0	0	0	0	0	0
ISC	0	0	0	0	0	0
AMC	0	2	15	6	9	4
TRADOC	0	0	1	3	3	3
MTMC	0	0	0	0	0	0
MDW	0	0	0	0	0	0
INSCOM	0	0	0	0	0	0
HSC	0	0	0	0	0	0
FORSCOM	0	0	1	1	4	4
ARNG	0	0	2	1	2	1
Total	0	2	19	11	19	13
Reported by Army	0	2	17	10	17	12
Difference	0	0	2	1	2	1
NOVs received during this period (total)						
WESTCOM	0	1	0	1	0	1
USMA	0	0	0	0	0	0
ISC	0	0	0	0	1	0
AMC	5	7	28	23	14	25
TRADOC	0	0	7	5	14	11
MTMC	0	0	0	0	0	0
MDW	0	0	0	0	1	9
INSCOM	0	0	0	1	0	0
HSC	0	0	0	0	0	0
FORSCOM	3	7	3	8	12	12
ARNG	3	0	4	9	4	10
Total	11	15	42	47	46	68
Reported by Army	9	15	38	38	42	58
Difference	2	0	4	9	4	10

Note: WESTCOM = U.S. Army Western Command; USMA = U.S. Military Academy; ISC = Intelligence and Security Command; AMC = Army Materiel Command; TRADOC = Training and Doctrine Command; MTMC = Military Traffic Management Command; MDW = Military District of Washington; INSCOM = Information Systems Command; HSC = Health Services Command; FORSCOM = U.S. Army Forces Command; ARNG = Army National Guard; NPDES = National Pollutant Discharge Elimination System; NOVs = notices of violation; and EPA = Environmental Protection Agency.

TABLE B-1

SUMMARY OF DESR TRENDS: ALL REPORTING MACOMs (Continued)

	1984	1985	1986	1987	1988	1989
NOVs received during this period requiring administrative changes						
WESTCOM	0	1	0	1	0	1
USMA	0	0	0	0	0	0
ISC	0	0	0	0	0	0
AMC	0	3	12	19	12	11
TRADOC	0	0	3	5	8	11
MTMC	0	0	0	0	0	0
MDW	0	0	0	0	1	8
INSCOM	0	0	0	1	0	0
HSC	0	0	0	0	0	0
FORSCOM	3	3	1	5	10	5
ARNG	0	0	3	6	2	6
Total	3	7	19	37	33	42
Reported by Army	3	7	16	31	31	36
Difference	0	0	3	6	2	6
NOVs received during this period requiring abatement						
WESTCOM	0	0	0	0	0	0
USMA	0	0	0	0	0	0
ISC	0	0	0	0	1	0
AMC	0	4	16	4	2	14
TRADOC	0	0	4	0	6	0
MTMC	0	0	0	0	0	0
MDW	0	0	0	0	0	1
INSCOM	0	0	0	0	0	0
HSC	0	0	0	0	0	0
FORSCOM	0	4	1	3	2	7
ARNG	0	0	3	3	2	4
Total	0	8	24	10	13	26
Reported by Army	0	8	21	7	11	22
Difference	0	0	3	3	2	4

Note: WESTCOM = U.S. Army Western Command; USMA = U.S. Military Academy; ISC = Intelligence and Security Command; AMC = Army Materiel Command; TRADOC = Training and Doctrine Command; MTMC = Military Traffic Management Command; MDW = Military District of Washington; INSCOM = Information Systems Command; HSC = Health Services Command; FORSCOM = U.S. Army Forces Command; ARNG = Army National Guard; NPDES = National Pollutant Discharge Elimination System; NOVs = notices of violation; and EPA = Environmental Protection Agency.

TABLE B-1

SUMMARY OF DESR TRENDS: ALL REPORTING MACOMs (Continued)

	1984	1985	1986	1987	1988	1989
NOVs resolved during this period (total)						
WESTCOM	1	1	0	0	0	0
USMA	0	0	0	0	0	0
ISC	0	0	0	0	0	0
AMC	7	2	11	19	14	10
TRADOC	0	0	3	4	9	11
MTMC	0	0	0	0	0	0
MDW	0	0	0	0	0	9
INSCOM	0	0	0	1	0	0
HSC	0	0	0	0	0	0
FORSCOM	2	4	0	4	12	10
ARNG	3	0	3	6	8	1
Total	13	7	17	34	43	41
Reported by Army	10	7	14	28	35	40
Difference	3	0	3	6	8	1
NOVs resolved through administrative changes						
WESTCOM	0	1	0	0	0	0
USMA	0	0	0	0	0	0
ISC	0	0	0	0	0	0
AMC	0	2	11	10	12	9
TRADOC	0	0	3	4	9	11
MTMC	0	0	0	0	0	0
MDW	0	0	0	0	0	9
INSCOM	0	0	0	1	0	0
HSC	0	0	0	0	0	0
FORSCOM	2	4	0	4	10	6
ARNG	0	0	2	5	4	0
Total	2	7	16	24	35	35
Reported by Army	2	7	14	19	31	35
Difference	0	0	2	5	4	0

Note: WESTCOM = U.S. Army Western Command; USMA = U.S. Military Academy; ISC = Intelligence and Security Command; AMC = Army Materiel Command; TRADOC = Training and Doctrine Command; MTMC = Military Traffic Management Command; MDW = Military District of Washington; INSCOM = Information Systems Command; HSC = Health Services Command; FORSCOM = U.S. Army Forces Command; ARNG = Army National Guard; NPDES = National Pollutant Discharge Elimination System; NOVs = notices of violation; and EPA = Environmental Protection Agency.

TABLE B-1

SUMMARY OF DESR TRENDS: ALL REPORTING MACOMs (Continued)

	1984	1985	1986	1987	1988	1989
NOVs resolved through abatement						
WESTCOM	1	0	0	0	0	0
USMA	0	0	0	0	0	0
ISC	0	0	0	0	0	0
AMC	0	0	0	9	2	1
TRADOC	0	0	0	0	0	0
MTMC	0	0	0	0	0	0
MDW	0	0	0	0	0	0
INSCOM	0	0	0	0	0	0
HSC	0	0	0	0	0	0
FORSCOM	0	0	0	0	2	4
ARNG	0	0	1	1	4	1
Total	1	0	1	10	8	6
Reported by Army	1	0	0	9	4	5
Difference	0	0	1	1	4	1
NPDES applied for with EPA						
WESTCOM	0	0	0	0	0	0
USMA	0	0	0	0	1	0
ISC	0	0	0	0	0	0
AMC	3	4	7	7	10	10
TRADOC	0	0	1	1	1	0
MTMC	0	0	0	0	0	0
MDW	0	0	0	0	0	0
INSCOM	0	0	0	0	0	0
HSC	0	0	0	0	0	0
FORSCOM	21	6	2	1	2	2
ARNG	0	0	6	6	11	8
Total	24	10	16	15	25	20
Reported by Army	24	10	10	9	14	12
Difference	0	0	6	6	11	8

Note: WESTCOM = U.S. Army Western Command; USMA = U.S. Military Academy; ISC = Intelligence and Security Command; AMC = Army Materiel Command; TRADOC = Training and Doctrine Command; MTMC = Military Traffic Management Command; MDW = Military District of Washington; INSCOM = Information Systems Command; HSC = Health Services Command; FORSCOM = U.S. Army Forces Command; ARNG = Army National Guard; NPDES = National Pollutant Discharge Elimination System; NOVs = notices of violation; and EPA = Environmental Protection Agency.

TABLE B-1

SUMMARY OF DESR TRENDS: ALL REPORTING MACOMs (Continued)

	1984	1985	1986	1987	1988	1989
NPDES applied for with state						
WESTCOM	0	0	0	0	0	0
USMA	0	0	0	0	1	0
ISC	0	0	0	0	0	0
AMC	5	11	12	19	16	8
TRADOC	0	0	21	7	4	2
MTMC	1	1	1	1	1	0
MDW	0	0	0	0	1	0
INSCOM	0	0	0	0	0	0
HSC	0	0	0	0	0	0
FORSCOM	12	10	4	9	14	6
ARNG	5	0	5	7	6	10
Total	23	22	43	43	43	26
Reported by Army	18	22	38	36	37	16
Difference	5	0	5	7	6	10
Water permits (minor/major)						
WESTCOM	0	0	0	0	0	0
USMA	0	0	0	0	0	0
ISC	0	0	0	0	0	0
AMC	0	0	0	0	0	0
TRADOC	0	0	0	0	0	0
MTMC	0	0	0	0	0	0
MDW	0	0	0	0	0	0
INSCOM	0	0	0	0	0	0
HSC	0	0	0	0	0	0
FORSCOM	0	0	0	0	0	0
ARNG	0	0	0	0	0	0
Total	0	0	0	0	0	0
Reported by Army	0	0	0	0	0	0
Difference	0	0	0	0	0	0

Note: WESTCOM = U.S. Army Western Command; USMA = U.S. Military Academy; ISC = Intelligence and Security Command; AMC = Army Materiel Command; TRADOC = Training and Doctrine Command; MTMC = Military Traffic Management Command; MDW = Military District of Washington; INSCOM = Information Systems Command; HSC = Health Services Command; FORSCOM = U.S. Army Forces Command; ARNG = Army National Guard; NPDES = National Pollutant Discharge Elimination System; NOVs = notices of violation; and EPA = Environmental Protection Agency.

TABLE B-1

SUMMARY OF DESR TRENDS: ALL REPORTING MACOMs (Continued)

	1984	1985	1986	1987	1988	1989
Minor/major sources in being						
WESTCOM	0	0	0	0	0	0
USMA	0	0	0	0	0	0
ISC	0	0	0	0	0	0
AMC	0	0	0	0	0	0
TRADOC	0	0	0	0	0	0
MTMC	0	0	0	0	0	0
MDW	0	0	0	0	0	0
INSCOM	0	0	0	0	0	0
HSC	0	0	0	0	0	0
FORSCOM	0	0	0	0	0	0
ARNG	0	0	0	0	0	0
Total	0	0	0	0	0	0
Reported by Army	0	0	0	0	0	0
Difference	0	0	0	0	0	0

Note: WESTCOM = U.S. Army Western Command; USMA = U.S. Military Academy; ISC = Intelligence and Security Command; AMC = Army Materiel Command; TRADOC = Training and Doctrine Command; MTMC = Military Traffic Management Command; MDW = Military District of Washington; INSCOM = Information Systems Command; HSC = Health Services Command; FORSCOM = U.S. Army Forces Command; ARNG = Army National Guard; NPDES = National Pollutant Discharge Elimination System; NOVs = notices of violation; and EPA = Environmental Protection Agency.

APPENDIX C

INSTALLATION CASE STUDIES

INSTALLATION CASE STUDIES

The following cases describe the circumstances surrounding the 49 notices of violation (NOVs) received by the 15 installations reviewed. These cases are based on interviews with the responsible installation staff members. The reasons are coded to correspond to Tables 4-1 and 4-2.

INSTALLATION A

NOV Description – Discharge Exceeds Permit Levels

Narrative – Contaminated ground water was being treated with scrubbers to reduce concentrations of volatile organics. Also, hexavalent chrome was in the ground water, but no treatment was needed to reduce chrome contamination because its concentrations did not exceed regulatory requirements. The treated ground water was discharged to surface waters pursuant to the provisions of a discharge permit.

Hexavalent chrome amounts began to exceed permit levels and an NOV was issued by the state. The installation was required to install a separate treatment system to reduce chrome levels to meet permit conditions prior to discharge.

Reasons for violation – Pollutant concentrations vary in the plume; this should have been considered in selecting remediation technologies. However, in-house expertise to evaluate proposed treatment methods was not available. The contractor failed to plan properly for varying scenarios regarding contaminant types and concentration levels. The contractor did not take a sufficient number of ground water samples from monitoring wells over time to identify the changing contamination levels for chrome. No contingency plan had been developed to allow for additional treatment in the event of increased pollutant concentration levels.

Summary of Reason(s)

- Inadequate technical knowledge of staff (K)
- Inadequate contractor knowledge. (C)

INSTALLATION B

NOV Description (Finding #1) – Violation of Biochemical Oxygen Demand Permit Discharge Limits

Narrative – The installation's sewage treatment plant was built in the 1950s and by 1990 was unable to meet NPDES permit limits on a consistent basis. Defense Management Reviews (DMRs) indicated biochemical oxygen demand (BOD) limits were being exceeded periodically, and the state's proposed new limits would further reduce the ability of the plant to meet discharge criteria. The NOV issued for failing to meet present limits prompted the development of a compliance agreement with the state to replace the existing treatment system by December 1994. The facility is currently operating under an interim permit. The new system was designed to meet proposed state criteria for all parameters.

Reason for violation – Treatment system's design is inadequate to meet current and proposed discharge criteria.

NOV Description (Finding #2) – Violation of Ammonia Nitrogen Permit Discharge Limits

Narrative – Same as above, except exceedance was for ammonia nitrogen limits from sewage treatment plant (STP).

Reason for violation – Same as Finding #1.

Summary of Reason(s)

Obsolete capital facility. (F)

INSTALLATION C

NOV Description – Exceedance of Effluent Limits (Reported in DMR)

Narrative – The installation's sewage treatment plant was built in the late 1940s and its secondary treatment system is now unable to meet permit limits on a consistent basis. Monitoring well samples (the effluent discharge is subsurface) have periodically indicated BOD discharge violations. State standards for discharge to ground water cannot be achieved. The installation has an interim permit in effect and a compliance agreement with the state to install a new STP by November 1994.

Reason for violation – Treatment system's design is inadequate to meet state discharge criteria.

Summary of Reason(s)

Obsolete capital facility. (F)

INSTALLATION D

NOV Description (Finding #1) – Discharge of Untreated Wastewater Into Waters of the State

Narrative – Untreated sewage was discharged from a manhole in the concrete sanitary sewer lines into a spillway leading to state waters. This discharge was a result of system overload resulting from infiltration during storm events. State inspectors noticed the discharge during a site visit. The design of new sewer lines was in progress at the time; the NOV accelerated the funding to reconstruct one-quarter mile of piping with sealed concrete.

Reason for violation – Inflow and infiltration problems associated with sanitary sewer lines resulting in the discharge of raw sewage into state waters. The project's acceleration after the issuance of an NOV may indicate that this project had not been given high priority.

Summary of Reason(s)

- Obsolete capital facility (F)
- *Low priority for* funding and action. (M)

NOV Description (Finding #2) – Exceedance of Total Suspended Solids (TSS) Levels Reported in DMR

Narrative – The sand filter in the STP had been off-line for approximately 1 year resulting from mechanical problems. During the time the sand filter was inoperative, NPDES permit limits were lowered for TSS to 15 milligrams per liter as a result of water quality criteria concerns in the receiving body of water. Without the sand filter, the plant could not achieve permit standards. An NOV was issued for exceeding permit limits for TSS. This prompted fund acceleration to reconstruct the sand filter as well as an existing trickling filter.

Reason for violation – Inadequate treatment of wastewater. With the more restrictive limits imposed on the plant effluent, and in view of failed samples for TSS, the system should have been renovated in a more expedient manner, rather than having the NOV act as the stimulus for promoting increased efforts to bring critical system components back on-line.

Summary of Reason(s)

- Change of regulations since facility built, leading to obsolescence (F)
- Low priority for funding and action. (M)

NOV Description – Exceeded Limits for Total Suspended Solids and Fecal Coliform (Reported on DMRs)

Narrative – A new NPDES permit no longer required sampling for phosphates. This allowed for the reduced use of coagulants such as aluminum sulfate. Ferric chloride and a polymer were used to replace aluminum sulfate. Adjusting dosages of these coagulants resulted in initial increases in TSS. No explanation was given for the fecal coliform exceedance.

Reason for violation – The initial runs of the system needed to establish the coagulant dosage necessary to achieve optimum coagulation resulted in TSS permit violations as reported on DMRs. Pilot or bench scale testing may have avoided these consequences.

Summary of Reason(s)

One-time event resulting from new procedures or equipment. (O)/(Misc.)

INSTALLATION E

NOV Description – No Biochemical Oxygen Demand Entry on Previous Month's DMR

Narrative – The BOD monthly sampling result was not included in the DMR for April 1988. All DMRs will be reviewed by the plant supervisor prior to submittal.

Reason for violation – No protocol existed in plant operations for review of laboratory analyses prior to submission to the state regulatory agency.

Summary of Reason(s)

- Inadequate staff knowledge of regulation (K)
- Inadequate management oversight. (M)

NOV Description (Finding #1) – Improper DMR Entry

Narrative – One of the routine samples was required to be a grab sample, but it was erroneously listed on the DMR as a composite sample. The sample actually taken was a grab sample.

Reason for violation – Improper entry on DMR by installation laboratory. Supervisory review necessary prior to submittal of reports to state regulatory agency.

Summary of Reason(s)

Inadequate staff knowledge of regulation. (K)

NOV Description (Finding #2) – Exceedance of Total Chlorine Limit on Permit

Narrative – Free chlorine residual exceeded permit limit.

Reason for violation – Scheduled preventive maintenance was not performed on chlorination system, resulting in an excess release of chlorine. Plant supervisory personnel need to verify that scheduled maintenance is performed and that records are maintained to verify the performance of this requirement.

Summary of Reason(s)

Inadequate supervision. (M)

NOV Description – Failure to Submit Plans for Dechlorination System

Narrative – The state regulatory agency cited the installation for failure to dechlorinate a plastic-lined sand pool's discharge. Installation Directorate of Engineering and Housing (DEH) personnel felt that the discharge did not warrant dechlorination because of its limited volume; the staff had commenced a study (benthic survey) of the effect of chlorine on biota.

Reason for violation – The state contended that dechlorination was necessary to protect aquatic biota and the installation had taken no steps to install a dechlorination system.

Summary of Reason(s)

- Dispute over scope or interpretation of regulation (K)/(Misc.)
- Inadequate capital facility. (F)

NOV Description – Failure to Submit Plans for Dechlorination System

Narrative – This action was a repeat NOV issued by the state as a result of the earlier NOV (described above). The installation had not submitted any plans for the construction of the dechlorination system required by the state. The previous NOV was reissued. As a result of a meeting with the state regulatory agency, a Consent Order was developed to allow for the biological study and eliminate further NOVs. Bioassay results indicated no adverse impact on biota in the receiving waterway and it was determined that dechlorination was not required.

Reason for violation – The state reissued the NOV as a repeat violation of an earlier notice requiring the commencement of the design of a dechlorination facility. The installation had not acquiesced to the earlier notice and instead commenced studies to assess the impact of chlorine on aquatic species in the receiving waterway.

Summary of Reason(s)

Rejection of regulator position and ignoring a prior NOV. (K)/(Misc.)

NOV Description (Finding #1) – Late Submission of DMR

Narrative – A DMR was not received by the state regulatory agency by the tenth of the month for NPDES analyses performed the previous month.

Reason for violation – Internal administrative procedures did not include oversight necessary to avoid this type of violation. A need for standard operating procedures (SOPs) and supervisory oversight increased attention and revision within the laboratory and the STP to allow for checks and balances designed to ensure compliance with state administrative reporting procedures.

Summary of Reason(s)

- Inadequate staff knowledge of regulation (K)
- Inadequate management oversight. (M)

NOV Description (Finding #2) – Data Reported on Improper DMR Form

Narrative – New DMR forms were issued by the state. The master form sent to the installation was misplaced. The outdated form was used to report sampling results.

Reason for violation – Administrative SOPs need updating, revision, and enforcement. Supervisory oversight needs to be reinforced. Lack of coordination with the state was a factor leading to issuance of this NOV.

Summary of Reason(s)

- One-time violation resulting from new procedures or equipment (Misc.)
- Inadequate staff knowledge of regulation (K)
- Inadequate management oversight. (M)

NOV Description (Finding #1) – Failed State Audit of Treatment Plant Laboratory

Narrative – The treatment plant laboratory had been conducting sampling and analyses in accordance with EPA's standard methods. However, the laboratory did not comply with state standards for recordkeeping and quality control processes.

Reason for violation – Laboratory personnel were unaware of the state requirements. Revision of standard analytical protocols was necessary to incorporate state requirements.

Summary of Reason(s)

Inadequate staff knowledge of regulation. (K)

NOV Description (Finding #2) – Failure to Commence Construction of Phosphate Treatment System per Schedule

Narrative – The wastewater permit issued in 1989 required a phosphate removal system within 36 months of permit issuance. A contract was awarded and would have resulted in achieving designated schedule milestones. Design and construction milestones were not achieved, however, with the delays being primarily attributable to the design contractor (according to installation personnel).

Reason for violation – Failure to provide the necessary oversight of a contract to achieve mandated project milestones. The state should have been made aware of the circumstances leading to the inability to achieve milestones. Inadequate liaison with the state and contractor regarding project status seems to be a factor that if properly managed might have avoided issuance of the NOV.

Summary of Reason(s)

- Change of regulations since facility was built (F)
- Low priority for funding and action (N)
- Contract management failure. (C)

INSTALLATION F

NOV Description – Failure to Provide Fish Passageways

Narrative – A dam constructed in the 1960s was impeding migrating fish species from spawning. An NOV was issued to allow for upriver spawning. According to the installation staff, the state had made no initial request for the construction of fish passages prior to the NOV (this seems somewhat unlikely unless the installation had already developed a poor relationship with the state, which is not indicated by the installation's relatively few NOVs).

Reason for violation – Failure to construct passageways for fish spawning. This issue may have been resolved in a different manner had the state first requested the construction of this system and then allowed the installation to develop an acceptable construction schedule.

Summary of Reason(s)

- Change of regulatory requirement since facility built (F)
- Low priority for funding and action (M)
- Rejection of regulator position and ignoring prior NOV. (K)/(Misc.)

NOV Description – Failure to File a Quarterly Analysis Report

Narrative – The installation's NPDES permit requires the installation to perform sampling and to file DMRs for tenant organizations. The tenant organization in this instance pretreats its industrial waste prior to sampling and monitoring by the installation. Some of the tenant organization's pollutant parameters are sampled on a monthly basis (with an accompanying report) while others require quarterly sampling and reporting. One quarterly report was not filed and an NOV was issued.

Reason for violation – The quarterly monitoring report was not filed by the responsible individual. This can only be attributed to an oversight on the part of the person delegated this task.

Summary of Reason(s)

- Failure to follow locally prescribed procedures (M)

- Inadequate management oversight (M)
- One-time human error. (Misc.)

NOV Description – Failure to Monitor in Accordance with Permit Requirements

Narrative – Some sampling and analyses required by the NPDES permit were not conducted, yet they were entered into DMR as if they had been completed. Additional sampling and analyses were not conducted in accordance with permit requirements. The state regulatory agency conducted an investigation resulting in a Federal court case.

Reason for violation – Misrepresentation of data appearing on DMR as well as failure to monitor effluent in a manner prescribed by a permit.

Summary of Reason(s)

- Inadequate staff knowledge of regulation (K)
- Inadequate management oversight (M)
- Malfeasance. (Misc.)

INSTALLATION G

NOV Description – Failure to Submit DMRs for the Period of August through December 1991

Narrative – The installation has above-ground petroleum-product storage tanks with secondary containment for spills. The installation has an NPDES permit to discharge storm water from the containment areas to waters of the state when necessary. Samples are taken and analyzed prior to discharge to avoid violation of water quality standards or permit criteria. Monthly DMRs are sent to the state regulatory agency. During the period of activities in support of the Gulf War, DEH management attention (and some personnel) were diverted, and DMRs for discharge from tank containment areas were not submitted to the state. During a subsequent NPDES permit renewal process, the state noticed the failure to submit DMRs and issued an NOV.

Reason for violation – Inability to comply with permit requirements for lack of personnel; the available personnel had been diverted to other tasks during the period in question. A factor contributing to this NOV was the failure to have a backup plan to allow for continuation of routine tasks, especially where compliance is an issue.

Summary of Reason(s)

- Low priority for funding and action (M)
- Failure to follow locally prescribed procedures (M)/(K)
- Inadequate management oversight. (M)

INSTALLATION H

NOV Description – Effluent from STP Unable to Meet NPDES Permit Limits

Narrative – A renewed permit in 1984 included limits on ammonia for the first time. The existing secondary treatment plant was known to be unable to meet the standard for monthly average ammonia discharges (2 parts per million). Two Federal Facilities Compliance Agreements were negotiated between the installation and the state/EPA between 1984 and 1989. An NOV was issued in 1989 as a culmination of 5 years of negotiations and operation under the FFCAs without any action on the part of the installation to install a process designed to meet the ammonia limit. One of the issues impeding progress was that the installation and its major command (MACOM) could not come to a consensus about how to fund the project.

The FFCA was modified in 1990 to develop milestones for a study of alternatives available to comply with the permit. The development of the milestones was initially a problem because the installation and the MACOM could not decide on options such as regionalization, privatization, or a facility upgrade. The FFCA was then structured to include a project to assess options. As a result of this study, the decision was made to upgrade the existing system to remove ammonia nitrogen.

In March 1991, the FFCA was modified again to allow for an upgrade of the treatment system. The facility must be in compliance with ammonia limits by 1 January 1995.

Reason for violation – Failure to respond in a timely manner to mandates of a compliance agreement resulting in the continuing violation of permit discharge limits.

Summary of Reason(s)

- Obsolete capital facility (F)
- Low priority for funding and action. (M)

INSTALLATION I

NOV Description (Finding #1) – No Thermometers in Laboratory Refrigerated Storage Area

Narrative – An EPA-contracted inspection of a treatment plant laboratory revealed the absence of a thermometer in the unit used for refrigerated storage of samples.

Reason for violation – Laboratory personnel were not aware of the requirement.

Summary of Reason(s)

Inadequate staff knowledge of regulation. (K)

NOV Description (Finding #2) – Presence of Weeds on Effluent Settling Chamber

Narrative – Duckweed growth was seen in a settling chamber and its influent sump. The inspector stated that this did not appear sanitary. The existing system provides for tertiary treatment. Water quality standards are being met. A skimmer was subsequently installed to remove weeds to the best extent possible. Subsequent inspections by EPA personnel indicated that this was an issue that should not have prompted an NOV.

Reason for violation – Overzealous inspector.

Summary of Reason(s)

Regulator error. (R)

NOV Description (Finding #3) – Incorrect Procedures in Use in a Laboratory

Narrative – A laboratory was using improper procedures according to an inspector. The laboratory had already initiated the use of proposed revised procedures that had not yet been authorized.

Reason for violation – Use of unauthorized laboratory procedures.

Summary of Reason(s)

Inadequate staff knowledge of regulation. (K)

NOV Description (Finding #4) – Incomplete Laboratory Records

Narrative – Calibration records for a flow meter were not maintained. In addition, documentation of sampling dates was not available.

Reason for violation – The laboratory did not have the calibration sheet for the flow meter and as a result it was not calibrating the meter as required. The laboratory was also not documenting sampling activity such as sampling dates in a logbook as required. Laboratory procedures need to be updated and more effective oversight of laboratory operations is needed.

Summary of Reason(s)

- Inadequate staff knowledge of regulation (K)
- Inadequate management oversight. (M)

INSTALLATION J

NOV Description – Unpermitted Discharge to State Waters Resulting in a Fish Kill

Narrative – Residual chlorine levels in the installation's drinking water system were not consistently in compliance with Safe Drinking Water Act criteria. A rechlorination facility was installed to allow for the addition of chlorine as necessary. The increase in water pressure at an inadequately designed connection between the chlorination system piping and the water main piping caused a break in the line.

The repair work was done by the contractors who had built the chlorination facility. The trench containing the water line became partially filled with chlorinated water discharged from the break; the contractor intended to pump down the trench water to an adjacent creek. An inspector from the State Water Quality Control Agency was on site at this time and required the discharge from the trench to be pumped to an area away from the creek. A second break occurred within a few days, was repaired, scoured with chlorine, and reconnected. On this occasion, the contractor pumped trench water to the creek. The state water quality inspector came on site after the second repair was completed and noticed a hose between the trench and the creek. The installation was issued an NOV. Another state inspector visited the site to evaluate damage to natural resources; he identified a fish kill in the creek downstream of the chlorine discharge. Ultimately, an expert was hired by the installation to design and oversee the proper connection of the piping system.

Reason for violation – Failure to provide proper oversight of construction operations. The use of a contractor with no experience in the type of connection required was a contributing factor.

Summary of Reason(s)

- Inadequate capital facility (F)/(O)
- Inadequate contractor knowledge (C)
- Inadequate contract management (M)
- Rejection of regulator position by ignoring a prior NOV. (M)

INSTALLATION K

NOV Description – Unauthorized Discharge

Narrative – A state inspector noticed a sludge waste pile adjacent to a drainage ditch that discharges to waters of the state. No chemical profile of the "sludge" was available. An NOV was issued. The material was found to be primarily sand and grit from a wash rack drain that had been recently cleaned out. A sample from the waste pile was sent to a contractor's laboratory for analysis, and the results did not indicate the presence of any hazardous constituents that would invoke Resources Conservation and Recovery Act requirements or violate water quality standards in the receiving waterway. Therefore, the material was found not to be subject to NPDES requirements. An unpermitted discharge report was not necessary. Data from the analysis were sent to the state's water commission by certified mail. No response was received; but that is standard practice for this regulatory agency.

Reason for violation – Had the environmental office been notified of this activity, the material would have been properly containerized and a waste analysis would have been performed prior to disposal. Even though the waste was finally determined to be nonhazardous, the installation's environmental office should have been notified about the cleaning of the wash rack drain. The deposition of this material adjacent to a storm water drainage ditch was not good practice because of runoff and silt deposition issues. The generation, storage, and disposal of solid wastes must be addressed in the installation's SOPs, which must then be enforced.

Summary of Reason(s)

- Lack of knowledge of installation activities (I)
- Nonenvironmental operator error. (K)

NOV Description (Finding #1) – Required Records not Being Maintained

Narrative – Sampling for pH and residual chlorine was being conducted by STP personnel as required by the NPDES permit. However, a log recording the sampling events (which was also a condition of the permit) was not being maintained. The environmental office had brought this to the attention of treatment plant personnel prior to issuance of the NOV.

Reason for violation – Failure to comply with permit requirements.

Summary of Reason(s)

- Failure to follow locally prescribed procedures (K)
- Inadequate management oversight (M)
- Nonenvironmental operator error. (K)

NOV Description (Finding #2) – Metering Equipment not Being Calibrated per Permit Conditions

Narrative – The treatment plant's NPDES permit requires the effluent flow meter to be calibrated yearly and a label affixed to the unit indicating the date of the last calibration. Under the permit, the calibration must be conducted by a "qualified person." This task is performed by an outside contractor. A state inspector found the unit to be beyond its yearly calibration based on the dates indicated by the label on the unit at the time of the inspection.

Reason for violation – Failure to provide for equipment calibration as required by discharge permit. The installation is considering the establishment of a contract that does not depend on notification to the outside contractor in order to perform the calibration; such a contract should contain terms that establish a yearly meter calibration requirement without having to receive prior authorization by a treatment plant or contracts personnel. Whether or not this occurs, some form of tracking system to identify required actions is needed.

Summary of Reason(s)

- Inadequate staff knowledge of regulation (K)
- Inadequate management oversight. (M)

NOV Description (Finding #3) – Sampling Protocol not in Compliance with Permit/Regulations

Narrative – The treatment plant was not taking duplicate samples for chlorine residual for quality assurance and control purposes as required by state regulations. Environmental office and treatment plant personnel felt that this requirement was not clearly stated in the permit. The permit contained references to state regulations, not all of which had been reviewed. Specifically, the protocol for

duplicate sampling had not been read or incorporated into treatment plant sampling guidance.

Reason for violation – Failure to develop a sampling protocol in compliance with permit conditions and state regulations. The environmental staff and treatment plant personnel were not aware of this requirement because it was not specifically stated in the permit (even though it was incorporated by reference to state regulations that had not been reviewed).

Summary of Reason(s)

Inadequate staff knowledge of regulation. (K)

INSTALLATION L

NOV Description – Exceedance of Discharge Permit Limits for Fecal Coliform

Narrative – A state inspector had taken grab samples downstream of the chlorination system. When analyzed, the samples were found to be in excess of permit limits for fecal coliform. The clarifier was being washed down at the time of the inspection; this may have resulted in an increase in flow rate and contaminants that appeared as a "slug" and overwhelmed the chlorination system. When this type of maintenance is performed, operators should adjust the chlorination system to account for the increase in flow and attendant chlorine demand.

Reason for violation – Failure to adjust chlorination dosage to account for flow increase during maintenance operations. The facility operations manual should include SOPs to address this kind of circumstance. Plant operators must be required to refer to an SOP manual as required. Certified operators should in any case have been aware of the probability of increased chlorine levels as a result of this procedure.

Summary of Reason(s)

Inadequate technical knowledge of staff. (K)

NOV Description (Finding #1) – Failure to Convert to Subsurface System by Milestone Date

Narrative – An STP at a Reserve unit supported by the installation had seen substantial decline in use over time. The capacity of the system was underutilized to such extent that the trickling filter had to be taken off-line because it could not support microbial growth. An Imhoff tank and chlorination unit became the operating components of the system. Sludge drying beds were taken out of use and sludge was pumped from the holding tank by a contractor. The discharge was to surface water; when the discharge permit came up for renewal, the state required conversion to subsurface disposal because the system was underutilized and because this would reduce unnecessary water quality impacts from a surface discharge.

The proposed new permit stipulated a date by which the conversion was to be completed. The contractor designing the new system had estimated an installation cost that was lower than the lowest bid filed by contractors looking to install the system. The most realistic installation cost, based on competitive bidding, was above

the funding level requested for the project; it prompted a new authorization cycle. The installation did not meet the conversion deadline and failed to notify the state regulatory agency. An NOV was issued.

Reason for violation – Failure to comply with, and report noncompliance with, a treatment system installation deadline. Failure to properly fund the project was the primary factor in this case. Had the installation notified the regulatory agency in a timely manner that the project deadline would not be met, a new milestone may have been negotiated to allow for the allocation of additional funds. An NOV might not have been issued. If the agency had been unwilling to negotiate, the NOV would have been issued anyway.

Summary of Reason(s)

- Obsolete capital facility (F)
- Change of regulatory requirement (F)
- Low priority for funding and action. (M)

NOV Description (Finding #2) – Failure to Submit Noncompliance and Progress Reports

Narrative – This NOV finding is associated with Finding #1, explained above, for failure to install the required facility. It is a good example of the tendency of regulators to issue multiple violations (and any NOV finding must go through a corrective action process) for a single event when it appears that agreements or prior directives are being ignored. This finding was specifically issued for failure to notify appropriate state regulatory personnel about subsurface disposal system construction progress. The installation claims to have been reporting progress regarding this project with the agency's engineering staff, but not to field personnel assigned to the project or enforcement staff.

Reason for violation – Failure to report progress milestones to appropriate regulatory agency personnel. The protocol about whom to report progress milestones to, and the manner in which to do so, should have been established when the new permit was issued requiring the conversion to a subsurface discharge system. The regulatory agency contributed to the NOV by failing to identify the proper

communication network while its personnel (albeit the inappropriate personnel) accepted progress reports given by the installation.

Summary of Reason(s)

Inadequate staff knowledge of regulation. (K)

INSTALLATION M

NOV Description – Failure to Provide Secondary Containment for Storage Tanks

Narrative – The installation is considered to be a major storage facility for petroleum fuels according to state regulations. As such, all above-ground fuel storage tanks require secondary containment. As a result of a state inspection, the facility received an NOV for failure to provide secondary containment for two fuel storage tanks. The tanks cited were the most recently installed units.

Reason for violation – Failure to review and comply with state regulations.

Summary of Reason(s)

- Inadequate capital facility (F)
- Inadequate staff knowledge of regulation. (K)

NOV Description (Finding #1) – Discharge of Oil and Liquid Waste to State Waters Without a Permit

Narrative – An inspection of the installation by a state regulator revealed two point sources discharging a petroleum product and an unidentified liquid into state waters. Those discharges were not permitted and the sources of the discharges were unknown to installation personnel. An oil-water separator was installed for one line. The other discharge was determined to be once-through cooling water and a closed-loop system was installed.

Reason for violation – Failure to identify discharges into state waters subject to permit requirements. Installation personnel were not only unaware of such discharges, but they were also not cognizant of regulations applicable to such discharges.

Summary of Reason(s)

- Inadequate staff knowledge of regulation (K)
- Inadequate knowledge of installation operations. (I)

NOV Description (Finding #2) – Discharge of Cooling Waters into State Waters Without a Permit

Narrative – During an inspection, two heating, ventilation, and air conditioning units were found to be discharging cooling water into state waters without a permit. The installation of a cooling tower eliminated those discharges.

Reason for violation – The installation's environmental personnel were unaware of discharges and of the fact that cooling water discharge is regulated and requires permitting.

Summary of Reason(s)

- Inadequate capital equipment (F)
- Inadequate staff knowledge of regulation (K)
- Inadequate knowledge of installation operations. (I)

INSTALLATION N

NOV Description – Inadequate Wastewater Treatment Plant Design

Narrative – The industrial water treatment plant in operation had been built in 1952. That system was hydraulically undersized at the time of the inspection and was therefore unable to properly treat the volume of wastewater generated at the time of the inspection or to meet permit limits. Subsequent to the NOV, a compliance agreement was developed to allow the system to be upgraded in modules and to become fully operational within 3 years.

Reason for violation – Failure to meet discharge permit conditions as a result of inadequate treatment system capacity and design. The installation staff failed to review discharge analyses that identified plant inadequacies or failed to do anything about those limitations if they were known to exist.

Summary of Reason(s)

- Obsolete capital facility (F)
- Low priority for funding and action (M)
- Inadequate technical knowledge of staff (K)
- Inadequate management oversight. (M)

NOV Description (Finding #1) – Inappropriate Sampling

Narrative – Waste treatment plant operators were taking samples of treated effluent at a downstream point further from the treatment system discharge point than was specified by the permit.

Reason for violation – Treatment plant personnel were not aware of permit requirements relative to sampling.

Summary of Reason(s)

- Inadequate staff knowledge of regulation (K)
- Inadequate management oversight (M)
- Error by operator lacking environmental expertise. (K)

NOV Description (Finding #2) – Sampling Frequency Not in Accordance with Permit Requirements

Narrative – Treatment plant personnel were taking samples twice each month instead of weekly as required for certain contaminants such as cadmium.

Reason for violation – Plant operators were unaware of permit sampling requirements.

Summary of Reason(s)

- Inadequate staff knowledge of regulation (K)
- Inadequate management oversight (M)
- Nonenvironmental operator error. (K)

NOV Description – Deficiency in Analysis for pH, Oil, and Grease

Narrative – No calibration record was kept for the pH meter. Also, two buffers for pH were used instead of three (as required by the testing protocol).

Reason for violation – Operator lack of knowledge of analytical criteria and permit requirements for calibration.

Summary of Reason(s)

- Inadequate staff knowledge of regulation (K)
- Inadequate staff technical knowledge (K)
- Nonenvironmental operator error. (K)

NOV Description – Oil and Grease Sampling and Analytical Procedures Deficient

Narrative – Sulfuric acid was not added prior to oil and grease analyses as required by the analytical protocol.

Reason for violation – Lack of knowledge of analytical procedures by treatment plant personnel.

Summary of Reason(s)

Inadequate staff knowledge of regulation. (K)

INSTALLATION O

NOV Description (Finding #1) – Laboratory not Certified

Narrative – Laboratories and their personnel must be certified under state criteria. Daily sampling and analysis requirements for the STP such as pH, temperature, and total suspended solids were performed by uncertified personnel. The requirement was clear in the regulations but not enforced during daily sampling.

Reason for violation – Uncertified personnel were allowed to perform sampling and analysis in violation of state regulations.

Summary of Reason(s)

- Inadequate staff knowledge of regulation (K)
- Inadequate management oversight. (M)

NOV Description (Finding #2) – Incomplete Analytical Reports

Narrative – The contractor-run laboratory performing monthly sample analyses was not including analysis time and sample type in reports. The contract with the laboratory was amended to include that data.

Reason for violation – The contractor-run laboratory did not comply with all state requirements relative to wastewater sampling and analysis. Installation personnel were not aware of those requirements.

Summary of Reason(s)

- Inadequate staff knowledge of regulation (K)
- Inadequate contractor knowledge. (C)

NOV Description – Discharge of Pollutant Without a Permit

Narrative – An overhead pipeline for transport of sewage to a treatment plant collapsed, releasing raw sewage into an adjacent brook and wetlands. The pipeline collapsed because corroded steel pipe stanchions failed.

Reason for violation – Pipeline stanchions were not inspected for corrosion or other evidence of a potential for collapse. This was a critical preventive maintenance omission in that the stanchions were immersed in water most of the time.

Summary of Reason(s)

- Deteriorated facility and inadequate maintenance (O)
- Equipment failure (O)
- Inadequate knowledge of installation operations. (I)

NOV Description – Discharges of Raw Sewage into Waters of the State

Narrative – An overflow of raw sewage at a lift station occurred, primarily because of an overload caused by infiltration problems in the piping. The infiltration problems are being addressed in a study.

Reason for violation – Inflow and infiltration problems causing overflow from lift stations as a result of hydraulic overload. The system will require an upgrade to avoid additional NOVs.

Summary of Reason(s)

- Deteriorated facility and inadequate maintenance (F)/(O)
- Low priority for funding and action (M)
- Inadequate staff technical knowledge. (K)

NOV Description (Finding #1) – Exceeded Permit Limits for Total Suspended Solids

Narrative – The supporting laboratory erroneously reported the maximum detection limit of the analytical method used instead of reporting the actual sample concentration for TSS. The state issued an NOV because the "sampling result," as listed on the DMR, exceeded permit limits. The installation brought the laboratory's error to the attention of the state after receipt of the NOV.

Reason for violation – Laboratory error in data submitted to state regulatory agency via DMR. Installation personnel should review each DMR to identify violations of permit limits and determine the cause prior to submission to regulator.

Summary of Reason(s)

- Inadequate contractor knowledge (C)
- Inadequate management oversight (M)

- Error by operator lacking environmental expertise. (K)

NOV Description (Finding #2) – Unpermitted Discharges of Wastewater

Narrative – Hydraulic overloading of system as a result of inflow and infiltration leading to discharge of raw sewage from pump station. This is a recurring NOV based on the situation explained in Finding #1; the initial NOV had been issued 6 months earlier.

Reason for violation – Sewage system deficiencies that require resolution. The study to determine the corrective action was still in progress.

Summary of Reason(s)

- Deteriorated facility and inadequate maintenance (F)/(D)
- Low priority for funding and action. (M)

NOV Description (Finding #3) – Flow Meters not in Place

Narrative – Flow meters, as required by state regulation, were not in place at two discharge points.

Reason for violation – Oversight on the part of the installation in not installing the flow meters as required. Installation treatment plant personnel were aware of the requirement.

Summary of Reason(s)

Failure to carry out known regulation provisions. (K)

NOV Description (Finding #4) – Exceedance of Fecal Coliform Limits Specified in Permit

Narrative – The contract laboratory repor d zero fecal coliform on a number of DMRs. After investigation of sampling and analytical techniques, it was determined that the lab was not dechlorinating the sample vial with reducing agent prior to analysis. This resulted in a spurious coliform count at the time of analysis. This deficiency was brought to light when a new contractor-run laboratory reported exceedance of fecal coliform limits. This exceedance was the result of an inadequately operated chlorination system at the treatment plant. The chlorine dosage required adjustment to allow for proper disinfection.

Reason for violation – Improperly operated chlorination system compounded by laboratory error.

Summary of Reason(s)

- Inadequate staff technical knowledge (K)
- Inadequate contractor knowledge. (C)

REPORT DOCUMENTATION PAGE

Form Approved
OPM No. 0704-0188

1. AGENCY USE ONLY *(Leave Blank)*	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED
	Sept 93	Final

4. TITLE AND SUBTITLE
Planning and Management Failures Cause Clean Water Act Violations

5. FUNDING NUMBERS
DACW31-90-D-0076
PE 0902198D

6. AUTHOR(S)
Douglas M. Brown, Robert J. Baxter

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
Logistics Management Institute
6400 Goldsboro Road
Bethesda, MD 20817-5886

8. PERFORMING ORGANIZATION REPORT NUMBER
LMI-CE211R3

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)
David C. Guzewich
Chief, Environmental Compliance Division
Army Environmental Center, ENAEC-EC, Bldg. E-4435
Aberdeen Proving Ground, MD 21010-5401

10. SPONSORING/MONITORING AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES

12a. DISTRIBUTION/AVAILABILITY STATEMENT
A: Approved for public release; distribution unlimited

12b. DISTRIBUTION CODE

13. ABSTRACT *(Maximum 200 words)*

In a study of notices of violation (NOVs) issued under the Clean Water Act (CWA), LMI found that recurring systemic problems exist. Many installations must deal with inadequate training, inadequate work forces, delayed funding, and divided responsibilities. The Army must identify the responsible persons, hold them accountable, and provide them with adequate and timely funding and personnel.

Most administrative/procedural violations are caused by a lack of knowledge about the regulatory requirements at the installation level. Personnel needing to be aware of CWA provisions include environmental professionals, facility operators, and the soldiers and civilians working on the installations. The Army should ensure that the responsible environmental staff members and facility operators at each installation are trained adequately and institute aggressive compliance-awareness programs.

Unlike other regulatory programs, numerous NOVs are issued under the CWA for causing pollution (i.e., exceeding permitted discharge levels). Installations have difficulty implementing corrective actions because of the limited availability of in-house technical experts, and because of limited funding for contract support, for capital projects, and for routine maintenance and upgrades. The Army should establish adequate technical expertise and a forward-looking funding system to ensure that its treatment systems can meet standards now and in the future.

14. SUBJECT TERMS
NOV, compliance, regulation, environment, CWA, wastewater, training, certification, management

15. NUMBER OF PAGES
114

16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
Unclassified	Unclassified	Unclassified	UL